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(54) Title: COMPOSITIONS FOR THE TREATMENT AND DIAGNOSIS OF BREAST CANCER AND METHODS FOR THEIR USE

(57) Abstract

Compositions and methods for the therapy and diagnosis of cancer, such as breast cancer, are disclosed. Compositions may comprise one or more breast tumor proteins, immunogenic portions thereof, or polynucleotides that encode such portions. Alternatively, a therapeutic composition may comprise an antigen presenting cell that expresses a breast tumor protein, or a T cell that is specific for cells expressing such a protein. Such compositions may be used, for example, for the prevention and treatment of diseases such as breast cancer. Diagnostic methods based on detecting a breast tumor protein, or mRNA encoding such a protein, in a sample are also provided.

COMPOSITIONS FOR THE TREATMENT AND DIAGNOSIS
OF BREAST CANCER AND METHODS FOR THEIR USE

TECHNICAL FIELD

The present invention relates generally to compositions and methods for the treatment of breast cancer. The invention is more particularly related to polypeptides comprising at least a portion of a protein that is preferentially expressed in breast tumor tissue and to polynucleotides encoding such polypeptides. Such polypeptides and polynucleotides may be used in vaccines and pharmaceutical compositions for treatment of breast cancer.

BACKGROUND OF THE INVENTION

Breast cancer is a significant health problem for women in the United States and throughout the world. Although advances have been made in detection and treatment of the disease, breast cancer remains the second leading cause of cancer-related deaths in women, affecting more than 180,000 women in the United States each year. For women in North America, the life-time odds of getting breast cancer are one in eight.

No vaccine or other universally successful method for the prevention or treatment of breast cancer is currently available. Management of the disease currently relies on a combination of early diagnosis (through routine breast screening procedures) and aggressive treatment, which may include one or more of a variety of treatments such as surgery, radiotherapy, chemotherapy and hormone therapy. The course of treatment for a particular breast cancer is often selected based on a variety of prognostic parameters, including an analysis of specific tumor markers. *See, e.g.*, Porter-Jordan and Lippman, *Breast Cancer* 8:73-100 (1994). However, the use of established markers often leads to a result that is difficult to interpret, and the high mortality observed in breast cancer patients indicates that improvements are needed in the treatment, diagnosis and prevention of the disease.

Accordingly, there is a need in the art for improved methods for the treatment and diagnosis of breast cancer. The present invention fulfills these needs and further provides other related advantages.

SUMMARY OF THE INVENTION

The present invention provides compounds and methods for the treatment and diagnosis of cancer, such as breast cancer. In one aspect, isolated polypeptides are provided comprising at least a portion of a breast tumor protein or a variant thereof. Certain portions and other variants are immunogenic, such that the ability of the variant to react with protein-specific antisera is not substantially diminished. With certain embodiments, the polypeptide comprises an amino acid sequence encoded by a polynucleotide selected from the group consisting of: (a) nucleotide sequences recited in SEQ ID NO: 1-61, 63-175, 178, 180, 182-313, 320-324, 342, 353, 366-368, 377, 382, 385, 389, 395, 397, 400, 408, 411, 413, 414, 416, 417, 419-423, 426, 427, 429, 431, 435-438, 441, 443-446, 450, 453, 454 and 463-468; (b) complements of said nucleotide sequences; and (c) variants of a sequence of (a) or (b). In specific embodiments, the inventive polypeptides comprise at least a portion of a tumor antigen that comprises an amino acid sequence selected from the group consisting of SEQ ID NO: 62, 176, 179, 181 and 469-473.

In related aspects, isolated polynucleotides encoding the above polypeptides, or a portion thereof (such as a portion encoding at least 15 contiguous amino acid residues of a breast tumor protein), are provided. In specific embodiments, such polynucleotides comprise a sequence selected from the group consisting of sequences provided in SEQ ID NO: 1-61, 63-175, 178, 180, 182-313, 320-324, 342, 353, 366-368, 377, 382, 385, 389, 395, 397, 400, 408, 411, 413, 414, 416, 417, 419-423, 426, 427, 429, 431, 435-438, 441, 443-446, 450, 453, 454 and 463-468 and variants thereof The present invention further provides expression vectors comprising the above polynucleotides, together with host cells transformed or transfected with such expression vectors. In preferred embodiments, the host cells are selected from the group consisting of *E. coli*, yeast and mammalian cells.

In another aspect, the present invention provides fusion proteins comprising a first and a second inventive polypeptide or, alternatively, an inventive polypeptide and a known breast tumor antigen.

The present invention also provides pharmaceutical compositions comprising at least one of the above polypeptides, or a polynucleotide encoding such a polypeptide, and a physiologically acceptable carrier, together with vaccines. For prophylactic or therapeutic use, comprising at least one such polypeptide or polynucleotide in combination with an immunostimulant. Pharmaceutical compositions and vaccines comprising one or more of the above fusion proteins are also provided.

The present invention further provides pharmaceutical compositions that comprise: (a) an antibody or antigen-binding fragment thereof that specifically binds to a breast tumor protein; and (b) a physiologically acceptable carrier.

Within further aspects, the present invention provides pharmaceutical compositions comprising: (a) an antigen presenting cell that expresses a polypeptide as described above and (b) a pharmaceutically acceptable carrier or excipient. Antigen presenting cells include dendritic cells, macrophages, monocytes, fibroblasts and B cells.

Within related aspects, vaccines are provided that comprise: (a) an antigen presenting cell that expresses a polypeptide as described above and (b) an immunostimulant.

In yet another aspect, methods are provided for inhibiting the development of breast cancer in a patient, comprising administering an effective amount of at least one of the above pharmaceutical compositions and/or vaccines.

The present invention further provides, within other aspects, methods for removing tumor cells from a biological sample, comprising contacting a biological sample with T cells that specifically react with a breast tumor protein, wherein the step of contacting is performed under conditions and for a time sufficient to permit the removal of cells expressing the protein from the sample.

Within related aspects, methods are provided for inhibiting the development of a cancer in a patient, comprising administering to a patient a biological sample treated as described above.

Methods are further provided, within other aspects, for stimulating and/or expanding T cells specific for a breast tumor protein, comprising contacting T cells with one or more of: (i) a polypeptide as described above; (ii) a polynucleotide encoding such a polypeptide; and/or (iii) an antigen presenting cell that expresses such a polypeptide;

under conditions and for a time sufficient to permit the stimulation and/or expansion of T cells. Isolated T cell populations comprising T cells prepared as described above are also provided.

Within further aspects, the present invention provides methods for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a T cell population as described above.

The present invention further provides methods for inhibiting the development of a cancer in a patient, comprising the steps of: (a) incubating $CD4^+$ and/or $CD8^+$ T cells isolated from a patient with one or more of: (i) a polypeptide comprising at least an immunogenic portion of a breast tumor protein; (ii) a polynucleotide encoding such a polypeptide; and (iii) an antigen-presenting cell that expressed such a polypeptide; and (b) administering to the patient an effective amount of the proliferated T cells, and thereby inhibiting the development of a cancer in the patient. Proliferated cells may, but need not, be cloned prior to administration to the patient.

The polypeptides disclosed herein may be usefully employed in the diagnosis and monitoring of breast cancer. In one aspect of the present invention, methods are provided for detecting a cancer in a patient, comprising: (a) contacting a biological sample obtained from a patient with a binding agent that is capable of binding to one of the above polypeptides; and (b) detecting in the sample an amount of polypeptide that binds to the binding agent; and (c) comparing the amount of polypeptide with a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in a patient. In preferred embodiments, the binding agent is an antibody, most preferably a monoclonal antibody. The cancer may be breast cancer.

In related aspects, methods are provided for monitoring the progression of a cancer in a patient, comprising: (a) contacting a biological sample obtained from a patient with a binding agent that is capable of binding to one of the above polypeptides; (b) detecting in the sample an amount of a polypeptide that binds to the binding agent; (c) repeating steps (a) and (b) using a biological sample obtained from the patient at a subsequent point in time; and (d) comparing the amounts of polypeptide detected in steps (b) and (c).

Within related aspects, the present invention provides antibodies, preferably monoclonal antibodies, that bind to the inventive polypeptides, as well as diagnostic kits comprising such antibodies, and methods of using such antibodies to inhibit the development of breast cancer.

The present invention further provides, within other aspects, methods for determining the presence or absence of a cancer in a patient, comprising the steps of: (a) contacting a biological sample obtained from a patient with an oligonucleotide that hybridizes to a polynucleotide that encodes a breast tumor protein; (b) detecting in the sample a level of a polynucleotide, preferably mRNA, that hybridizes to the oligonucleotide; and (c) comparing the level of polynucleotide that hybridizes to the oligonucleotide with a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient. Within certain embodiments, the amount of mRNA is detected via polymerase chain reaction using, for example, at least one oligonucleotide primer that hybridizes to a polynucleotide encoding a polypeptide as recited above, or a complement of such a polynucleotide. Within other embodiments, the amount of mRNA is detected using a hybridization technique, employing an oligonucleotide probe that hybridizes to a polynucleotide that encodes a polypeptide as recited above, or a complement of such a polynucleotide.

In related aspects, diagnostic kits comprising the above oligonucleotide probes or primers are provided.

These and other aspects of the present invention will become apparent upon reference to the following detailed description. All references disclosed herein are hereby incorporated by reference in their entirety as if each was incorporated individually.

BRIEF DESCRIPTION OF THE DRAWING AND SEQUENCE IDENTIFIERS

Fig. 1 shows the results of a Northern blot of the clone SYN18C6 (SEQ ID NO: 40).

SEQ ID NO: 1 is the determined cDNA sequence of JBT2.

SEQ ID NO: 2 is the determined cDNA sequence of JBT6.

SEQ ID NO: 3 is the determined cDNA sequence of JBT7.

SEQ ID NO: 4 is the determined cDNA sequence of JBT10.

SEQ ID NO: 5 is the determined cDNA sequence of JBT13.

SEQ ID NO: 6 is the determined cDNA sequence of JBT14.

SEQ ID NO: 7 is the determined cDNA sequence of JBT15.

SEQ ID NO: 8 is the determined cDNA sequence of JBT16.

SEQ ID NO: 9 is the determined cDNA sequence of JBT17.

SEQ ID NO: 10 is the determined cDNA sequence of JBT22.

SEQ ID NO: 11 is the determined cDNA sequence of JBT25.

SEQ ID NO: 12 is the determined cDNA sequence of JBT28.

SEQ ID NO: 13 is the determined cDNA sequence of JBT32.

SEQ ID NO: 14 is the determined cDNA sequence of JBT33.

SEQ ID NO: 15 is the determined cDNA sequence of JBT34.

SEQ ID NO: 16 is the determined cDNA sequence of JBT36.

SEQ ID NO: 17 is the determined cDNA sequence of JBT37.

SEQ ID NO: 18 is the determined cDNA sequence of JBT51.

SEQ ID NO: 19 is the determined cDNA sequence of JBTT1.

SEQ ID NO: 20 is the determined cDNA sequence of JBTT7.

SEQ ID NO: 21 is the determined cDNA sequence of JBTT11.

SEQ ID NO: 22 is the determined cDNA sequence of JBTT14.

SEQ ID NO: 23 is the determined cDNA sequence of JBTT18.

SEQ ID NO: 24 is the determined cDNA sequence of JBTT19.

SEQ ID NO: 25 is the determined cDNA sequence of JBTT20.

SEQ ID NO: 26 is the determined cDNA sequence of JBTT21.

SEQ ID NO: 27 is the determined cDNA sequence of JBTT22.

SEQ ID NO: 28 is the determined cDNA sequence of JBTT28.

SEQ ID NO: 29 is the determined cDNA sequence of JBTT29.

SEQ ID NO: 30 is the determined cDNA sequence of JBTT33.

SEQ ID NO: 31 is the determined cDNA sequence of JBTT37.

SEQ ID NO: 32 is the determined cDNA sequence of JBTT38.

SEQ ID NO: 33 is the determined cDNA sequence of JBTT47.

SEQ ID NO: 34 is the determined cDNA sequence of JBTT48.

SEQ ID NO: 35 is the determined cDNA sequence of JBTT50.

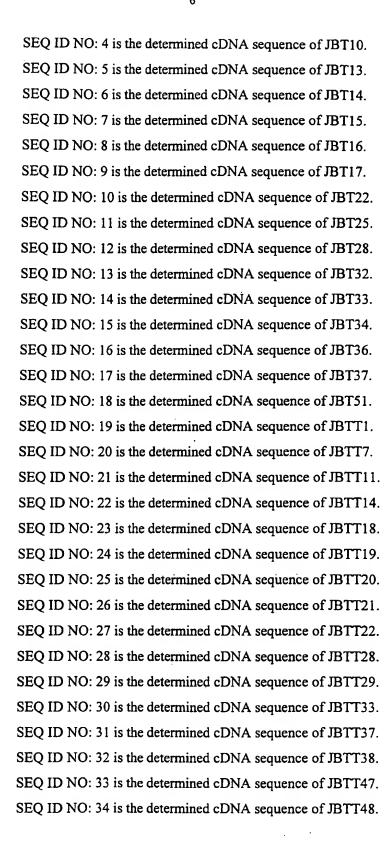SEQ ID NO: 36 is the determined cDNA sequence of JBTT51.

SEQ ID NO: 37 is the determined cDNA sequence of JBTT52.

SEQ ID NO: 38 is the determined cDNA sequence of JBTT54.

SEQ ID NO: 39 is the determined cDNA sequence of SYN17F4.

SEQ ID NO: 40 is the determined cDNA sequence of SYN18C6.

SEQ ID NO: 41 is the determined cDNA sequence of SYN19A2.

SEQ ID NO: 42 is the determined cDNA sequence of SYN19C8.

SEQ ID NO: 43 is the determined cDNA sequence of SYN20A12.

SEQ ID NO: 44 is the determined cDNA sequence of SYN20G6.

SEQ ID NO: 45 is the determined cDNA sequence of SYN20G6-2.

SEQ ID NO: 46 is the determined cDNA sequence of SYN21B9.

SEQ ID NO: 47 is the determined cDNA sequence of SYN21B9-2.

SEQ ID NO: 48 is the determined cDNA sequence of SYN21C10.

SEQ ID NO: 49 is the determined cDNA sequence of SYN21G10.

SEQ ID NO: 50 is the determined cDNA sequence of SYN21G10-2.

SEQ ID NO: 51 is the determined cDNA sequence of SYN21G11.

SEQ ID NO: 52 is the determined cDNA sequence of SYN21G11-2.

SEQ ID NO: 53 is the determined cDNA sequence of SYN21H8.

SEQ ID NO: 54 is the determined cDNA sequence of SYN22A10.

SEQ ID NO: 55 is the determined cDNA sequence of SYN22A10-2.

SEQ ID NO: 56 is the determined cDNA sequence of SYN22A12.

SEQ ID NO: 57 is the determined cDNA sequence of SYN22A2.

SEQ ID NO: 58 is the determined cDNA sequence of SYN22B4.

SEQ ID NO: 59 is the determined cDNA sequence of SYN22C2.

SEQ ID NO: 60 is the determined cDNA sequence of SYN22E10.

SEQ ID NO: 61 is the determined cDNA sequence of SYN22F2.

SEQ ID NO: 62 is a predicted amino acid sequence for SYN18C6.

SEQ ID NO: 63 is the determined cDNA sequence of B723P.

SEQ ID NO: 64 is the determined cDNA sequence for B724P.

SEQ ID NO: 65 is the determined cDNA sequence of B770P.

SEQ ID NO: 66 is the determined cDNA sequence of B716P.

SEQ ID NO: 67 is the determined cDNA sequence of B725P.

SEQ ID NO: 68 is the determined cDNA sequence of B717P.

SEQ ID NO: 69 is the determined cDNA sequence of B771P.

SEQ ID NO: 70 is the determined cDNA sequence of B722P.

SEQ ID NO: 71 is the determined cDNA sequence of B726P.

SEQ ID NO: 72 is the determined cDNA sequence of B727P.

SEQ ID NO: 73 is the determined cDNA sequence of B728P.

SEQ ID NO: 74-87 are the determined cDNA sequences of isolated clones which show homology to known sequences.

SEQ ID NO: 88 is the determined cDNA sequence of 13053.

SEQ ID NO: 89 is the determined cDNA sequence of 13057.

SEQ ID NO: 90 is the determined cDNA sequence of 13059.

SEQ ID NO: 91 is the determined cDNA sequence of 13065.

SEQ ID NO: 92 is the determined cDNA sequence of 13067.

SEQ ID NO: 93 is the determined cDNA sequence of 13068.

SEQ ID NO: 94 is the determined cDNA sequence of 13071.

SEQ ID NO: 95 is the determined cDNA sequence of 13072.

SEQ ID NO: 96 is the determined cDNA sequence of 13073.

SEQ ID NO: 97 is the determined cDNA sequence of 13075.

SEQ ID NO: 98 is the determined cDNA sequence of 13078.

SEQ ID NO: 99 is the determined cDNA sequence of 13079.

SEQ ID NO: 100 is the determined cDNA sequence of 13081.

SEQ ID NO: 101 is the determined cDNA sequence of 13082.

SEQ ID NO: 102 is the determined cDNA sequence of 13092.

SEQ ID NO: 103 is the determined cDNA sequence of 13097.

SEQ ID NO: 104 is the determined cDNA sequence of 13101.

SEQ ID NO: 105 is the determined cDNA sequence of 13102.

SEQ ID NO: 106 is the determined cDNA sequence of 13119.

SEQ ID NO: 107 is the determined cDNA sequence of 13131.

SEQ ID NO: 108 is the determined cDNA sequence of 13133.

SEQ ID NO: 109 is the determined cDNA sequence of 13135.

SEQ ID NO: 110 is the determined cDNA sequence of 13139.

SEQ ID NO: 111 is the determined cDNA sequence of 13140.

SEQ ID NO: 112 is the determined cDNA sequence of 13146.

SEQ ID NO: 113 is the determined cDNA sequence of 13147.

SEQ ID NO: 114 is the determined cDNA sequence of 13148.

SEQ ID NO: 115 is the determined cDNA sequence of 13149.

SEQ ID NO: 116 is the determined cDNA sequence of 13151.

SEQ ID NO: 117 is the determined cDNA sequence of 13051

SEQ ID NO: 118 is the determined cDNA sequence of 13052

SEQ ID NO: 119 is the determined cDNA sequence of 13055

SEQ ID NO: 120 is the determined cDNA sequence of 13058

SEQ ID NO: 121 is the determined cDNA sequence of 13062

SEQ ID NO: 122 is the determined cDNA sequence of 13064

SEQ ID NO: 123 is the determined cDNA sequence of 13080

SEQ ID NO: 124 is the determined cDNA sequence of 13093

SEQ ID NO: 125 is the determined cDNA sequence of 13094

SEQ ID NO: 126 is the determined cDNA sequence of 13095

SEQ ID NO: 127 is the determined cDNA sequence of 13096

SEQ ID NO: 128 is the determined cDNA sequence of 13099

SEQ ID NO: 129 is the determined cDNA sequence of 13100

SEQ ID NO: 130 is the determined cDNA sequence of 13103

SEQ ID NO: 131 is the determined cDNA sequence of 13106

SEQ ID NO: 132 is the determined cDNA sequence of 13107

SEQ ID NO: 133 is the determined cDNA sequence of 13108

SEQ ID NO: 134 is the determined cDNA sequence of 13121

SEQ ID NO: 135 is the determined cDNA sequence of 13126

SEQ ID NO: 136 is the determined cDNA sequence of 13129

SEQ ID NO: 137 is the determined cDNA sequence of 13130

SEQ ID NO: 138 is the determined cDNA sequence of 13134

SEQ ID NO: 139 is the determined cDNA sequence of 13141

SEQ ID NO: 140 is the determined cDNA sequence of 13142

SEQ ID NO: 141 is the determined cDNA sequence of 14376

SEQ ID NO: 142 is the determined cDNA sequence of 14377

SEQ ID NO: 143 is the determined cDNA sequence of 14383

SEQ ID NO: 144 is the determined cDNA sequence of 14384

SEQ ID NO: 145 is the determined cDNA sequence of 14387

SEQ ID NO: 146 is the determined cDNA sequence of 14392

SEQ ID NO: 147 is the determined cDNA sequence of 14394

SEQ ID NO: 148 is the determined cDNA sequence of 14398

SEQ ID NO: 149 is the determined cDNA sequence of 14401

SEQ ID NO: 150 is the determined cDNA sequence of 14402

SEQ ID NO: 151 is the determined cDNA sequence of 14405

SEQ ID NO: 152 is the determined cDNA sequence of 14409

SEQ ID NO: 153 is the determined cDNA sequence of 14412

SEQ ID NO: 154 is the determined cDNA sequence of 14414

SEQ ID NO: 155 is the determined cDNA sequence of 14415

SEQ ID NO: 156 is the determined cDNA sequence of 14416

SEQ ID NO: 157 is the determined cDNA sequence of 14419

SEQ ID NO: 158 is the determined cDNA sequence of 14426

SEQ ID NO: 159 is the determined cDNA sequence of 14427

SEQ ID NO: 160 is the determined cDNA sequence of 14375

SEQ ID NO: 161 is the determined cDNA sequence of 14378

SEQ ID NO: 162 is the determined cDNA sequence of 14379

SEQ ID NO: 163 is the determined cDNA sequence of 14380

SEQ ID NO: 164 is the determined cDNA sequence of 14381

SEQ ID NO: 165 is the determined cDNA sequence of 14382

SEQ ID NO: 166 is the determined cDNA sequence of 14388

SEQ ID NO: 167 is the determined cDNA sequence of 14399

SEQ ID NO: 168 is the determined cDNA sequence of 14406

SEQ ID NO: 169 is the determined cDNA sequence of 14407

SEQ ID NO: 170 is the determined cDNA sequence of 14408

SEQ ID NO: 171 is the determined cDNA sequence of 14417

SEQ ID NO: 172 is the determined cDNA sequence of 14418

SEQ ID NO: 173 is the determined cDNA sequence of 14423

SEQ ID NO: 174 is the determined cDNA sequence of 14424

SEQ ID NO: 175 is the determined cDNA sequence of B726P-20

SEQ ID NO: 176 is the predicted amino acid sequence of B726P-20

SEQ ID NO: 177 is a PCR primer

SEQ ID NO: 178 is the determined cDNA sequence of B726P-74

SEQ ID NO: 179 is the predicted amino acid sequence of B726P-74

SEQ ID NO: 180 is the determined cDNA sequence of B726P-79

SEQ ID NO: 181 is the predicted amino acid sequence of B726P-79 .

SEQ ID NO: 182 is the determined cDNA sequence of 19439.1, showing homology to the mammaglobin gene

SEQ ID NO: 183 is the determined cDNA sequence of 19407.1, showing homology to the human keratin gene

SEQ ID NO: 184 is the determined cDNA sequence of 19428.1, showing homology to human chromosome 17 clone

SEQ ID NO: 185 is the determined cDNA sequence of B808P (19408), showing no significant homology to any known gene

SEQ ID NO: 186 is the determined cDNA sequence of 19460.1, showing no significant homology to any known gene

SEQ ID NO: 187 is the determined cDNA sequence of 19419.1, showing homology to Ig kappa light chain

SEQ ID NO: 188 is the determined cDNA sequence of 19411.1, showing homology to human alpha-1 collagen

SEQ ID NO: 189 is the determined cDNA sequence of 19420.1, showing homology to mus musculus proteinase-3

SEQ ID NO: 190 is the determined cDNA sequence of 19432.1, showing homology to human high motility group box

SEQ ID NO: 191 is the determined cDNA sequence of 19412.1, showing homology to the human plasminogen activator gene

SEQ ID NO: 192 is the determined cDNA sequence of 19415.1, showing homology to mitogen activated protein kinase

SEQ ID NO: 193 is the determined cDNA sequence of 19409.1, showing homology to the chondroitin sulfate proteoglycan protein

SEQ ID NO: 194 is the determined cDNA sequence of 19406.1, showing no significant homology to any known gene

SEQ ID NO: 195 is the determined cDNA sequence of 19421.1, showing homology to human fibronectin

SEQ ID NO: 196 is the determined cDNA sequence of 19426.1, showing homology to the retinoic acid receptor responder 3

SEQ ID NO: 197 is the determined cDNA sequence of 19425.1, showing homology to MyD88 mRNA

SEQ ID NO: 198 is the determined cDNA sequence of 19424.1, showing homology to peptide transporter (TAP-1) mRNA

SEQ ID NO: 199 is the determined cDNA sequence of 19429.1, showing no significant homology to any known gene

SEQ ID NO: 200 is the determined cDNA sequence of 19435.1, showing homology to human polymorphic epithelial mucin

SEQ ID NO: 201 is the determined cDNA sequence of B813P (19434.1), showing homology to human GATA-3 transcription factor

SEQ ID NO: 202 is the determined cDNA sequence of 19461.1, showing homology to the human AP-2 gene

SEQ ID NO: 203 is the determined cDNA sequence of 19450.1, showing homology to DNA binding regulatory factor

SEQ ID NO: 204 is the determined cDNA sequence of 19451.1, showing homology to Na/H exchange regulatory co-factor

SEQ ID NO: 205 is the determined cDNA sequence of 19462.1, showing no significant homology to any known gene

SEQ ID NO: 206 is the determined cDNA sequence of 19455.1, showing homology to human mRNA for histone HAS.Z

SEQ ID NO: 207 is the determined cDNA sequence of 19459.1, showing

homology to PAC clone 179N16

SEQ ID NO: 208 is the determined cDNA sequence of 19464.1, showing no significant homology to any known gene

SEQ ID NO: 209 is the determined cDNA sequence of 19414.1, showing homology to lipophilin B

SEQ ID NO: 210 is the determined cDNA sequence of 19413.1, showing homology to chromosome 17 clone hRPK.209_J_20

SEQ ID NO: 211 is the determined cDNA sequence of 19416.1, showing no significant homology to any known gene

SEQ ID NO: 212 is the determined cDNA sequence of 19437.1, showing homology to human clone 24976 mRNA

SEQ ID NO: 213 is the determined cDNA sequence of 19449.1, showing homology to mouse DNA for PG-M core protein

SEQ ID NO: 214 is the determined cDNA sequence of 19446.1, showing no significant homology to any known gene

SEQ ID NO: 215 is the determined cDNA sequence of 19452.1, showing no significant homology to any known gene

SEQ ID NO: 216 is the determined cDNA sequence of 19483.1, showing no significant homology to any known gene

SEQ ID NO: 217 is the determined cDNA sequence of 19526.1, showing homology to human lipophilin C

SEQ ID NO: 218 is the determined cDNA sequence of 19484.1, showing homology to the secreted cement gland protein XAG-2

SEQ ID NO: 219 is the determined cDNA sequence of 19470.1, showing no significant homology to any known gene

SEQ ID NO: 220 is the determined cDNA sequence of 19469.1, showing homology to the human HLA-DM gene

SEQ ID NO: 221 is the determined cDNA sequence of 19482.1, showing homology to the human pS2 protein gene

SEQ ID NO: 222 is the determined cDNA sequence of B805P (19468.1), showing no significant homology to any known gene

SEQ ID NO: 223 is the determined cDNA sequence of 19467.1, showing homology to human thrombospondin mRNA

SEQ ID NO: 224 is the determined cDNA sequence of 19498.1, showing homology to the CDC2 gene involved in cell cycle control

SEQ ID NO: 225 is the determined cDNA sequence of 19506.1, showing homology to human cDNA for TREB protein

SEQ ID NO: 226 is the determined cDNA sequence of B806P (19505.1), showing no significant homology to any known gene

SEQ ID NO: 227 is the determined cDNA sequence of 19486.1, showing homology to type I epidermal keratin

SEQ ID NO: 228 is the determined cDNA sequence of 19510.1, showing homology to glucose transporter for glycoprotein

SEQ ID NO: 229 is the determined cDNA sequence of 19512.1, showing homology to the human lysyl hydroxylase gene

SEQ ID NO: 230 is the determined cDNA sequence of 19511.1, showing homology to human palimotoyl-protein thioesterase

SEQ ID NO: 231 is the determined cDNA sequence of 19508.1, showing homology to human alpha enolase

SEQ ID NO: 232 is the determined cDNA sequence of B807P (19509.1), showing no significant homology to any known gene

SEQ ID NO: 233 is the determined cDNA sequence of B809P (19520.1), showing homology to clone 102D24 on chromosome 11q13.31

SEQ ID NO: 234 is the determined cDNA sequence of 19507.1, showing homology toprosome beta-subunit

SEQ ID NO: 235 is the determined cDNA sequence of 19525.1, showing homology to human pro-urokinase precursor

SEQ ID NO: 236 is the determined cDNA sequence of 19513.1, showing no significant homology to any known gene

SEQ ID NO: 237 is the determined cDNA sequence of 19517.1, showing homology to human PAC 128M19 clone

SEQ ID NO: 238 is the determined cDNA sequence of 19564.1, showing

homology to human cytochrome P450-IIB

SEQ ID NO: 239 is the determined cDNA sequence of 19553.1, showing homology to human GABA-A receptor pi subunit

SEQ ID NO: 240 is the determined cDNA sequence of B811P (19575.1), showing no significant homology to any known gene

SEQ ID NO: 241 is the determined cDNA sequence of B810P (19560.1), showing no significant homology to any known gene

SEQ ID NO: 242 is the determined cDNA sequence of 19588.1, showing homology to aortic carboxypetidase-like protein

SEQ ID NO: 243 is the determined cDNA sequence of 19551.1, showing homology to human BCL-1 gene

SEQ ID NO: 244 is the determined cDNA sequence of 19567.1, showing homology to human proteasome-related mRNA

SEQ ID NO: 245 is the determined cDNA sequence of B803P (19583.1), showing no significant homology to any known gene

SEQ ID NO: 246 is the determined cDNA sequence of B812P (19587.1), showing no significant homology to any known gene

SEQ ID NO: 247 is the determined cDNA sequence of B802P (19392.2), showing homology to human chromosome 17

SEQ ID NO: 248 is the determined cDNA sequence of 19393.2, showing homology to human nicein B2 chain

SEQ ID NO: 249 is the determined cDNA sequence of 19398.2, human MHC class II DQ alpha mRNA

SEQ ID NO: 250 is the determined cDNA sequence of B804P (19399.2), showing homology to human Xp22 BAC GSHB-184P14

SEQ ID NO: 251 is the determined cDNA sequence of 19401.2, showing homology to human ikB kinase-b gene

SEQ ID NO: 252 is the determined cDNA sequence of 20266, showing no significant homology to any known gene

SEQ ID NO: 253 is the determined cDNA sequence of B826P (20270), showing no significant homology to any known gene

SEQ ID NO: 254 is the determined cDNA sequence of 20274, showing no significant homology to any known gene

SEQ ID NO: 255 is the determined cDNA sequence of 20276, showing no significant homology to any known gene

SEQ ID NO: 256 is the determined cDNA sequence of 20277, showing no significant homology to any known gene

SEQ ID NO: 257 is the determined cDNA sequence of B823P (20280), showing no significant homology to any known gene

SEQ ID NO: 258 is the determined cDNA sequence of B821P (20281), showing no significant homology to any known gene

SEQ ID NO: 259 is the determined cDNA sequence of B824P (20294), showing no significant homology to any known gene

SEQ ID NO: 260 is the determined cDNA sequence of 20303, showing no significant homology to any known gene

SEQ ID NO: 261 is the determined cDNA sequence of B820P (20310), showing no significant homology to any known gene

SEQ ID NO: 262 is the determined cDNA sequence of B825P (20336), showing no significant homology to any known gene

SEQ ID NO: 263 is the determined cDNA sequence of B827P (20341), showing no significant homology to any known gene

SEQ ID NO: 264 is the determined cDNA sequence of 20941, showing no significant homology to any known gene

SEQ ID NO: 265 is the determined cDNA sequence of 20954, showing no significant homology to any known gene

SEQ ID NO: 266 is the determined cDNA sequence of 20961, showing no significant homology to any known gene

SEQ ID NO: 267 is the determined cDNA sequence of 20965, showing no significant homology to any known gene

SEQ ID NO: 268 is the determined cDNA sequence of 20975, showing no significant homology to any known gene

SEQ ID NO: 269 is the determined cDNA sequence of 20261, showing

homology to Human p120 catenin

SEQ ID NO: 270 is the determined cDNA sequence of B822P (20262), showing homology to Human membrane glycoprotein 4F2

SEQ ID NO: 271 is the determined cDNA sequence of 20265, showing homology to Human Na, K-ATPase Alpha 1

SEQ ID NO: 272 is the determined cDNA sequence of 20267, showing homology to Human heart HS 90, partial cds

SEQ ID NO: 273 is the determined cDNA sequence of 20268, showing homology to Human mRNA GPI-anchored protein p137

SEQ ID NO: 274 is the determined cDNA sequence of 20271, showing homology to Human cleavage stimulation factor 77 kDa subunit

SEQ ID NO: 275 is the determined cDNA sequence of 20272, showing homology to Human p190-B

SEQ ID NO: 276 is the determined cDNA sequence of 20273, showing homology to Human ribophorin

SEQ ID NO: 277 is the determined cDNA sequence of 20278, showing homology to Human ornithine amino transferase

SEQ ID NO: 278 is the determined cDNA sequence of 20279, showing homology to Human S-adenosylmethionine synthetase

SEQ ID NO: 279 is the determined cDNA sequence of 20293, showing homology to Human x inactivation transcript

SEQ ID NO: 280 is the determined cDNA sequence of 20300, showing homology to Human cytochrome p450

SEQ ID NO: 281 is the determined cDNA sequence of 20305, showing homology to Human elongation factor-1 alpha

SEQ ID NO: 282 is the determined cDNA sequence of 20306, showing homology to Human epithelial ets protein

SEQ ID NO: 283 is the determined cDNA sequence of 20307, showing homology to Human signal transducer mRNA

SEQ ID NO: 284 is the determined cDNA sequence of 20313, showing homology to Human GABA-A receptor pi subunit mRNA

SEQ ID NO: 285 is the determined cDNA sequence of 20317, showing homology to Human tyrosine phosphatase

SEQ ID NO: 286 is the determined cDNA sequence of 20318, showing homology to Human cathepsine B proteinase

SEQ ID NO: 287 is the determined cDNA sequence of 20320, showing homology to Human 2-phosphopyruvate-hydratase-alpha-enolase

SEQ ID NO: 288 is the determined cDNA sequence of 20321, showing homology to Human E-cadherin

SEQ ID NO: 289 is the determined cDNA sequence of 20322, showing homology to Human hsp86

SEQ ID NO: 290 is the determined cDNA sequence of B828P (20326), showing homology to Human x inactivation transcript

SEQ ID NO: 291 is the determined cDNA sequence of 20333, showing homology to Human chromatin regulator, SMARCA5

SEQ ID NO: 292 is the determined cDNA sequence of 20335, showing homology to Human sphingolipid activator protein 1

SEQ ID NO: 293 is the determined cDNA sequence of 20337, showing homology to Human hepatocyte growth factor activator inhibitor type 2

SEQ ID NO: 294 is the determined cDNA sequence of 20338, showing homology to Human cell ashesion molecule CD44

SEQ ID NO: 295 is the determined cDNA sequence of 20340, showing homology to Human nuclear factor (erythroid-derived)-like 1

SEQ ID NO: 296 is the determined cDNA sequence of 20938, showing homology to Human vinculin mRNA

SEQ ID NO: 297 is the determined cDNA sequence of 20939, showing homology to Human elongation factor EF-1-alpha

SEQ ID NO: 298 is the determined cDNA sequence of 20940, showing homology to Human nestin gene

SEQ ID NO: 299 is the determined cDNA sequence of 20942, showing homology to Human pancreatic ribonuclease

SEQ ID NO: 300 is the determined cDNA sequence of 20943, showing

homology to Human transcobalamin I

SEQ ID NO: 301 is the determined cDNA sequence of 20944, showing homology to Human beta-tubulin

SEQ ID NO: 302 is the determined cDNA sequence of 20946, showing homology to Human HS1 protein

SEQ ID NO: 303 is the determined cDNA sequence of 20947, showing homology to Human cathepsin B

SEQ ID NO: 304 is the determined cDNA sequence of 20948, showing homology to Human testis enhanced gene transcript

SEQ ID NO: 305 is the determined cDNA sequence of 20949, showing homology to Human elongation factor EF-1-alpha

SEQ ID NO: 306 is the determined cDNA sequence of 20950, showing homology to Human ADP-ribosylation factor 3

SEQ ID NO: 307 is the determined cDNA sequence of 20951, showing homology to Human IFP53 or WRS for tryptophanyl-tRNA synthetase

SEQ ID NO: 308 is the determined cDNA sequence of 20952, showing homology to Human cyclin-dependent protein kinase

SEQ ID NO: 308 is the determined cDNA sequence of 20957, showing homology to Human alpha-tubulin sioform 1

SEQ ID NO: 309 is the determined cDNA sequence of 20959, showing homology to Human tyrosine phosphatase-61bp deletion

SEQ ID NO: 310 is the determined cDNA sequence of 20966, showing homology to Human tyrosine phosphatase

SEQ ID NO: 311 is the determined cDNA sequence of B830P (20976), showing homology to Human nuclear factor NF 45

SEQ ID NO: 312 is the determined cDNA sequence of B829P (20977), showing homology to Human delta-6 fatty acid desaturase

SEQ ID NO: 313 is the determined cDNA sequence of 20978, showing homology to Human nuclear aconitase

SEQ ID NO: 314 is the determined cDNA sequence of 19465, showing no significant homology to any known gene.

SEQ ID NO: 315 is the determined cDNA sequence of clone 23176.

SEQ ID NO: 316 is the determined cDNA sequence of clone 23140.

SEQ ID NO: 317 is the determined cDNA sequence of clone 23166.

SEQ ID NO: 318 is the determined cDNA sequence of clone 23167.

SEQ ID NO: 319 is the determined cDNA sequence of clone 23177.

SEQ ID NO: 320 is the determined cDNA sequence of clone 23217.

SEQ ID NO: 321 is the determined cDNA sequence of clone 23169.

SEQ ID NO: 322 is the determined cDNA sequence of clone 23160.

SEQ ID NO: 323 is the determined cDNA sequence of clone 23182.

SEQ ID NO: 324 is the determined cDNA sequence of clone 23232.

SEQ ID NO: 325 is the determined cDNA sequence of clone 23203.

SEQ ID NO: 326 is the determined cDNA sequence of clone 23198.

SEQ ID NO: 327 is the determined cDNA sequence of clone 23224.

SEQ ID NO: 328 is the determined cDNA sequence of clone 23142.

SEQ ID NO: 329 is the determined cDNA sequence of clone 23138.

SEQ ID NO: 330 is the determined cDNA sequence of clone 23147.

SEQ ID NO: 331 is the determined cDNA sequence of clone 23148.

SEQ ID NO: 332 is the determined cDNA sequence of clone 23149.

SEQ ID NO: 333 is the determined cDNA sequence of clone 23172.

SEQ ID NO: 334 is the determined cDNA sequence of clone 23158.

SEQ ID NO: 335 is the determined cDNA sequence of clone 23156.

SEQ ID NO: 336 is the determined cDNA sequence of clone 23221.

SEQ ID NO: 337 is the determined cDNA sequence of clone 23223.

SEQ ID NO: 338 is the determined cDNA sequence of clone 23155.

SEQ ID NO: 339 is the determined cDNA sequence of clone 23225.

SEQ ID NO: 340 is the determined cDNA sequence of clone 23226.

SEQ ID NO: 341 is the determined cDNA sequence of clone 23228.

SEQ ID NO: 342 is the determined cDNA sequence of clone 23229.

SEQ ID NO: 343 is the determined cDNA sequence of clone 23231.

SEQ ID NO: 344 is the determined cDNA sequence of clone 23154.

SEQ ID NO: 345 is the determined cDNA sequence of clone 23157.

SEQ ID NO: 346 is the determined cDNA sequence of clone 23153.

SEQ ID NO: 347 is the determined cDNA sequence of clone 23159.

SEQ ID NO: 348 is the determined cDNA sequence of clone 23152.

SEQ ID NO: 349 is the determined cDNA sequence of clone 23161.

SEQ ID NO: 350 is the determined cDNA sequence of clone 23162.

SEQ ID NO: 351 is the determined cDNA sequence of clone 23163.

SEQ ID NO: 352 is the determined cDNA sequence of clone 23164.

SEQ ID NO: 353 is the determined cDNA sequence of clone 23165.

SEQ ID NO: 354 is the determined cDNA sequence of clone 23151.

SEQ ID NO: 355 is the determined cDNA sequence of clone 23150.

SEQ ID NO: 356 is the determined cDNA sequence of clone 23168.

SEQ ID NO: 357 is the determined cDNA sequence of clone 23146.

SEQ ID NO: 358 is the determined cDNA sequence of clone 23170.

SEQ ID NO: 359 is the determined cDNA sequence of clone 23171.

SEQ ID NO: 360 is the determined cDNA sequence of clone 23145.

SEQ ID NO: 361 is the determined cDNA sequence of clone 23174.

SEQ ID NO: 362 is the determined cDNA sequence of clone 23175.

SEQ ID NO: 363 is the determined cDNA sequence of clone 23144.

SEQ ID NO: 364 is the determined cDNA sequence of clone 23178.

SEQ ID NO: 365 is the determined cDNA sequence of clone 23179.

SEQ ID NO: 366 is the determined cDNA sequence of clone 23180.

SEQ ID NO: 367 is the determined cDNA sequence of clone 23181.

SEQ ID NO: 368 is the determined cDNA sequence of clone 23143

SEQ ID NO: 369 is the determined cDNA sequence of clone 23183.

SEQ ID NO: 370 is the determined cDNA sequence of clone 23184.

SEQ ID NO: 371 is the determined cDNA sequence of clone 23185.

SEQ ID NO: 372 is the determined cDNA sequence of clone 23186.

SEQ ID NO: 373 is the determined cDNA sequence of clone 23187.

SEQ ID NO: 374 is the determined cDNA sequence of clone 23190.

SEQ ID NO: 375 is the determined cDNA sequence of clone 23189.

SEQ ID NO: 376 is the determined cDNA sequence of clone 23202.

SEQ ID NO: 378 is the determined cDNA sequence of clone 23191.

SEQ ID NO: 379 is the determined cDNA sequence of clone 23188.

SEQ ID NO: 380 is the determined cDNA sequence of clone 23194.

SEQ ID NO: 381 is the determined cDNA sequence of clone 23196.

SEQ ID NO: 382 is the determined cDNA sequence of clone 23195.

SEQ ID NO: 383 is the determined cDNA sequence of clone 23193.

SEQ ID NO: 384 is the determined cDNA sequence of clone 23199.

SEQ ID NO: 385 is the determined cDNA sequence of clone 23200.

SEQ ID NO: 386 is the determined cDNA sequence of clone 23192.

SEQ ID NO: 387 is the determined cDNA sequence of clone 23201.

SEQ ID NO: 388 is the determined cDNA sequence of clone 23141.

SEQ ID NO: 389 is the determined cDNA sequence of clone 23139.

SEQ ID NO: 390 is the determined cDNA sequence of clone 23204.

SEQ ID NO: 391 is the determined cDNA sequence of clone 23205.

SEQ ID NO: 392 is the determined cDNA sequence of clone 23206.

SEQ ID NO: 393 is the determined cDNA sequence of clone 23207.

SEQ ID NO: 394 is the determined cDNA sequence of clone 23208.

SEQ ID NO: 395 is the determined cDNA sequence of clone 23209.

SEQ ID NO: 396 is the determined cDNA sequence of clone 23210.

SEQ ID NO: 397 is the determined cDNA sequence of clone 23211.

SEQ ID NO: 398 is the determined cDNA sequence of clone 23212.

SEQ ID NO: 399 is the determined cDNA sequence of clone 23214.

SEQ ID NO: 400 is the determined cDNA sequence of clone 23215.

SEQ ID NO: 401 is the determined cDNA sequence of clone 23216.

SEQ ID NO: 402 is the determined cDNA sequence of clone 23137.

SEQ ID NO: 403 is the determined cDNA sequence of clone 23218.

SEQ ID NO: 404 is the determined cDNA sequence of clone 23220.

SEQ ID NO: 405 is the determined cDNA sequence of clone 19462.

SEQ ID NO: 406 is the determined cDNA sequence of clone 19430.

SEQ ID NO: 407 is the determined cDNA sequence of clone 19407.

SEQ ID NO: 408 is the determined cDNA sequence of clone 19448.

SEQ ID NO: 409 is the determined cDNA sequence of clone 19447.

SEQ ID NO: 410 is the determined cDNA sequence of clone 19426.

SEQ ID NO: 411 is the determined cDNA sequence of clone 19441.

SEQ ID NO: 412 is the determined cDNA sequence of clone 19454.

SEQ ID NO: 413 is the determined cDNA sequence of clone 19463.

SEQ ID NO: 414 is the determined cDNA sequence of clone 19419.

SEQ ID NO: 415 is the determined cDNA sequence of clone 19434.

SEQ ID NO: 416 is the determined extended cDNA sequence of B820P.

SEQ ID NO: 417 is the determined extended cDNA sequence of B821P.

SEQ ID NO: 418 is the determined extended cDNA sequence of B822P.

SEQ ID NO: 419 is the determined extended cDNA sequence of B823P.

SEQ ID NO: 420 is the determined extended cDNA sequence of B824P.

SEQ ID NO: 421 is the determined extended cDNA sequence of B825P.

SEQ ID NO: 422 is the determined extended cDNA sequence of B826P.

SEQ ID NO: 423 is the determined extended cDNA sequence of B827P.

SEQ ID NO: 424 is the determined extended cDNA sequence of B828P.

SEQ ID NO: 425 is the determined extended cDNA sequence of B829P.

SEQ ID NO: 426 is the determined extended cDNA sequence of B830P.

SEQ ID NO: 427 is the determined cDNA sequence of clone 266B4.

SEQ ID NO: 428 is the determined cDNA sequence of clone 22892.

SEQ ID NO: 429 is the determined cDNA sequence of clone 266G3.

SEQ ID NO: 430 is the determined cDNA sequence of clone 22890.

SEQ ID NO: 431 is the determined cDNA sequence of clone 264B4.

SEQ ID NO: 432 is the determined cDNA sequence of clone 22883.

SEQ ID NO: 433 is the determined cDNA sequence of clone 22882.

SEQ ID NO: 434 is the determined cDNA sequence of clone 22880.

SEQ ID NO: 435 is the determined cDNA sequence of clone 263G1.

SEQ ID NO: 436 is the determined cDNA sequence of clone 263G6.

SEQ ID NO: 437 is the determined cDNA sequence of clone 262B2.

SEQ ID NO: 438 is the determined cDNA sequence of clone 262B6.

SEQ ID NO: 439 is the determined cDNA sequence of clone 22869.

SEQ ID NO: 440 is the determined cDNA sequence of clone 21374.

SEQ ID NO: 441 is the determined cDNA sequence of clone 21362.

SEQ ID NO: 442 is the determined cDNA sequence of clone 21349.

SEQ ID NO: 443 is the determined cDNA sequence of clone 21309.

SEQ ID NO: 444 is the determined cDNA sequence of clone 21097.

SEQ ID NO: 445 is the determined cDNA sequence of clone 21096.

SEQ ID NO: 446 is the determined cDNA sequence of clone 21094.

SEQ ID NO: 447 is the determined cDNA sequence of clone 21093.

SEQ ID NO: 448 is the determined cDNA sequence of clone 21091.

SEQ ID NO: 449 is the determined cDNA sequence of clone 21089.

SEQ ID NO: 450 is the determined cDNA sequence of clone 21087.

SEQ ID NO: 451 is the determined cDNA sequence of clone 21085.

SEQ ID NO: 452 is the determined cDNA sequence of clone 21084.

SEQ ID NO: 453 is a first partial cDNA sequence of clone 2BT1-40.

SEQ ID NO: 454 is a second partial cDNA sequence of clone 2BT1-40.

SEQ ID NO: 455 is the determined cDNA sequence of clone 21063.

SEQ ID NO: 456 is the determined cDNA sequence of clone 21062.

SEQ ID NO: 457 is the determined cDNA sequence of clone 21060.

SEQ ID NO: 458 is the determined cDNA sequence of clone 21053.

SEQ ID NO: 459 is the determined cDNA sequence of clone 21050.

SEQ ID NO: 460 is the determined cDNA sequence of clone 21036.

SEQ ID NO: 461 is the determined cDNA sequence of clone 21037.

SEQ ID NO: 462 is the determined cDNA sequence of clone 21048.

SEQ ID NO: 463 is a consensus DNA sequence of B726P (referred to as B726P-spliced_seq_B726P).

SEQ ID NO: 464 is the determined cDNA sequence of a second splice form of B726P (referred to as 27490.seq_B726P).

SEQ ID NO: 465 is the determined cDNA sequence of a third splice form of B726P (referred to as 27068.seq_B726P).

SEQ ID NO: 466 is the determined cDNA sequence of a second splice form of B726P (referred to as 23113.seq_B726P).

SEQ ID NO: 467 is the determined cDNA sequence of a second splice form of B726P (referred to as 23103.seq_B726P).

SEQ ID NO: 468 is the determined cDNA sequence of a second splice form of B726P (referred to as 19310.seq_B726P).

SEQ ID NO: 469 is the predicted amino acid sequence encoded by the upstream ORF of SEQ ID NO: 463.

SEQ ID NO: 470 is the predicted amino acid sequence encoded by SEQ ID NO: 464.

SEQ ID NO: 471 is the predicted amino acid sequence encoded by SEQ ID NO: 465.

SEQ ID NO: 472 is the predicted amino acid sequence encoded by SEQ ID NO: 466.

SEQ ID NO: 473 is the predicted amino acid sequence encoded by SEQ ID NO: 467.

DETAILED DESCRIPTION OF THE INVENTION

As noted above, the present invention is generally directed to compositions and methods for the therapy and diagnosis of cancer, such as breast cancer. The compositions described herein may include breast tumor polypeptides, polynucleotides encoding such polypeptides, binding agents such as antibodies, antigen presenting cells (APCs) and/or immune system cells (e.g., T cells). Polypeptides of the present invention generally comprise at least a portion (such as an immunogenic portion) of a breast tumor protein or a variant thereof. A "breast tumor protein" is a protein that is expressed in breast tumor cells at a level that is at least two fold, and preferably at least five fold, greater than the level of expression in a normal tissue, as determined using a representative assay provided herein. Certain breast tumor proteins are tumor proteins that react detectably (within an immunoassay, such as an ELISA or Western blot) with antisera of a patient afflicted with breast cancer. Polynucleotides of the subject invention generally comprise a DNA or RNA sequence that encodes all or a portion of such a polypeptide, or that is complementary to such a sequence. Antibodies are generally immune system proteins, or antigen-binding fragments thereof, that are capable of

binding to a polypeptide as described above. Antigen presenting cells include dendritic cells, macrophages, monocytes, fibroblasts and B-cells that express a polypeptide as described above. T cells that may be employed within such compositions are generally T cells that are specific for a polypeptide as described above.

The present invention is based on the discovery of human breast tumor proteins. Sequences of polynucleotides encoding specific tumor proteins are provided in SEQ ID NOS:1-175, 178, 180 and 182-468.

BREAST TUMOR PROTEIN POLYNUCLEOTIDES

Any polynucleotide that encodes a breast tumor protein or a portion or other variant thereof as described herein is encompassed by the present invention. Preferred polynucleotides comprise at least 15 consecutive nucleotides, preferably at least 30 consecutive nucleotides and more preferably at least 45 consecutive nucleotides, that encode a portion of a breast tumor protein. More preferably, a polynucleotide encodes an immunogenic portion of a breast tumor protein. Polynucleotides complementary to any such sequences are also encompassed by the present invention. Polynucleotides may be single-stranded (coding or antisense) or double-stranded, and may be DNA (genomic, cDNA or synthetic) or RNA molecules. RNA molecules include HnRNA molecules, which contain introns and correspond to a DNA molecule in a one-to-one manner, and mRNA molecules, which do not contain introns. Additional coding or non-coding sequences may, but need not, be present within a polynucleotide of the present invention, and a polynucleotide may, but need not, be linked to other molecules and/or support materials.

Polynucleotides may comprise a native sequence (i.e., an endogenous sequence that encodes a breast tumor protein or a portion thereof) or may comprise a variant of such a sequence. Polynucleotide variants may contain one or more substitutions, additions, deletions and/or insertions such that the immunogenicity of the encoded polypeptide is not diminished, relative to a native tumor protein. The effect on the immunogenicity of the encoded polypeptide may generally be assessed as described herein. Variants preferably exhibit at least about 70% identity, more preferably at least about 80% identity and most preferably at least about 90% identity to a polynucleotide

sequence that encodes a native breast tumor protein or a portion thereof. The term "variants" also encompasses homologous genes of xenogenic origin.

Two polynucleotide or polypeptide sequences are said to be "identical" if the sequence of nucleotides or amino acids in the two sequences is the same when aligned for maximum correspondence as described below. Comparisons between two sequences are typically performed by comparing the sequences over a comparison window to identify and compare local regions of sequence similarity. A "comparison window" as used herein, refers to a segment of at least about 20 contiguous positions, usually 30 to about 75, 40 to about 50, in which a sequence may be compared to a reference sequence of the same number of contiguous positions after the two sequences are optimally aligned.

Optimal alignment of sequences for comparison may be conducted using the Megalign program in the Lasergene suite of bioinformatics software (DNASTAR, Inc., Madison, WI), using default parameters. This program embodies several alignment schemes described in the following references: Dayhoff, M.O. (1978) A model of evolutionary change in proteins – Matrices for detecting distant relationships. In Dayhoff, M.O. (ed.) Atlas of Protein Sequence and Structure, National Biomedical Research Foundation, Washington DC Vol. 5, Suppl. 3, pp. 345-358; Hein J. (1990) Unified Approach to Alignment and Phylogenes pp. 626-645 *Methods in Enzymology* vol. 183, Academic Press, Inc., San Diego, CA; Higgins, D.G. and Sharp, P.M. (1989) *CABIOS* 5:151-153; Myers, E.W. and Muller W. (1988) *CABIOS* 4:11-17; Robinson, E.D. (1971) *Comb. Theor 11*:105; Santou, N. Nes, M. (1987) *Mol. Biol. Evol. 4*:406-425; Sneath, P.H.A. and Sokal, R.R. (1973) *Numerical Taxonomy – the Principles and Practice of Numerical Taxonomy*, Freeman Press, San Francisco, CA; Wilbur, W.J. and Lipman, D.J. (1983) *Proc. Natl. Acad., Sci. USA 80*:726-730.

Preferably, the "percentage of sequence identity" is determined by comparing two optimally aligned sequences over a window of comparison of at least 20 positions, wherein the portion of the polynucleotide or polypeptide sequence in the comparison window may comprise additions or deletions (i.e. gaps) of 20 percent or less, usually 5 to 15 percent, or 10 to 12 percent, as compared to the reference sequences (which does not comprise additions or deletions) for optimal alignment of the two

sequences. The percentage is calculated by determining the number of positions at which the identical nucleic acid bases or amino acid residue occurs in both sequences to yield the number of matched positions, dividing the number of matched positions by the total number of positions in the reference sequence (i.e. the window size) and multiplying the results by 100 to yield the percentage of sequence identity.

Variants may also, or alternatively, be substantially homologous to a native gene, or a portion or complement thereof. Such polynucleotide variants are capable of hybridizing under moderately stringent conditions to a naturally occurring DNA sequence encoding a native breast tumor protein (or a complementary sequence). Suitable moderately stringent conditions include prewashing in a solution of 5 X SSC, 0.5% SDS, 1.0 mM EDTA (pH 8.0); hybridizing at 50°C-65°C, 5 X SSC, overnight; followed by washing twice at 65°C for 20 minutes with each of 2X, 0.5X and 0.2X SSC containing 0.1% SDS.

It will be appreciated by those of ordinary skill in the art that, as a result of the degeneracy of the genetic code, there are many nucleotide sequences that encode a polypeptide as described herein. Some of these polynucleotides bear minimal homology to the nucleotide sequence of any native gene. Nonetheless, polynucleotides that vary due to differences in codon usage are specifically contemplated by the present invention. Further, alleles of the genes comprising the polynucleotide sequences provided herein are within the scope of the present invention. Alleles are endogenous genes that are altered as a result of one or more mutations, such as deletions, additions and/or substitutions of nucleotides. The resulting mRNA and protein may, but need not, have an altered structure or function. Alleles may be identified using standard techniques (such as hybridization, amplification and/or database sequence comparison).

Polynucleotides may be prepared using any of a variety of techniques. For example, a polynucleotide may be identified, as described in more detail below, by screening a microarray of cDNAs for tumor-associated expression (i.e., expression that is at least five fold greater in a breast tumor than in normal tissue, as determined using a representative assay provided herein). Such screens may be performed using a Synteni microarray (Palo Alto, CA) according to the manufacturer's instructions (and essentially

as described by Schena et al., *Proc. Natl. Acad. Sci. USA 93*:10614-10619, 1996 and Heller et al., *Proc. Natl. Acad. Sci. USA 94*:2150-2155, 1997). Alternatively, polypeptides may be amplified from cDNA prepared from cells expressing the proteins described herein, such as breast tumor cells. Such polynucleotides may be amplified via polymerase chain reaction (PCR). For this approach, sequence-specific primers may be designed based on the sequences provided herein, and may be purchased or synthesized.

An amplified portion may be used to isolate a full length gene from a suitable library (*e.g.*, a breast tumor cDNA library) using well known techniques. Within such techniques, a library (cDNA or genomic) is screened using one or more polynucleotide probes or primers suitable for amplification. Preferably, a library is size-selected to include larger molecules. Random primed libraries may also be preferred for identifying 5' and upstream regions of genes. Genomic libraries are preferred for obtaining introns and extending 5' sequences.

For hybridization techniques, a partial sequence may be labeled (*e.g.*, by nick-translation or end-labeling with ^{32}P) using well known techniques. A bacterial or bacteriophage library is then screened by hybridizing filters containing denatured bacterial colonies (or lawns containing phage plaques) with the labeled probe (*see* Sambrook et al., *Molecular Cloning: A Laboratory Manual*, Cold Spring Harbor Laboratories, Cold Spring Harbor, NY, 1989). Hybridizing colonies or plaques are selected and expanded, and the DNA is isolated for further analysis. cDNA clones may be analyzed to determine the amount of additional sequence by, for example, PCR using a primer from the partial sequence and a primer from the vector. Restriction maps and partial sequences may be generated to identify one or more overlapping clones. The complete sequence may then be determined using standard techniques, which may involve generating a series of deletion clones. The resulting overlapping sequences are then assembled into a single contiguous sequence. A full length cDNA molecule can be generated by ligating suitable fragments, using well known techniques.

Alternatively, there are numerous amplification techniques for obtaining a full length coding sequence from a partial cDNA sequence. Within such techniques, amplification is generally performed via PCR. Any of a variety of commercially available kits may be used to perform the amplification step. Primers may be designed

using, for example, software well known in the art. Primers are preferably 22-30 nucleotides in length, have a GC content of at least 50% and anneal to the target sequence at temperatures of about 68°C to 72°C. The amplified region may be sequenced as described above, and overlapping sequences assembled into a contiguous sequence.

One such amplification technique is inverse PCR (*see* Triglia et al., *Nucl. Acids Res. 16*:8186, 1988), which uses restriction enzymes to generate a fragment in the known region of the gene. The fragment is then circularized by intramolecular ligation and used as a template for PCR with divergent primers derived from the known region. Within an alternative approach, sequences adjacent to a partial sequence may be retrieved by amplification with a primer to a linker sequence and a primer specific to a known region. The amplified sequences are typically subjected to a second round of amplification with the same linker primer and a second primer specific to the known region. A variation on this procedure, which employs two primers that initiate extension in opposite directions from the known sequence, is described in WO 96/38591. Another such technique is known as "rapid amplification of cDNA ends" or RACE. This technique involves the use of an internal primer and an external primer, which hybridizes to a polyA region or vector sequence, to identify sequences that are 5' and 3' of a known sequence. Additional techniques include capture PCR (Lagerstrom et al., *PCR Methods Applic. 1*:111-19, 1991) and walking PCR (Parker et al., *Nucl. Acids. Res. 19*:3055-60, 1991). Other methods employing amplification may also be employed to obtain a full length cDNA sequence.

In certain instances, it is possible to obtain a full length cDNA sequence by analysis of sequences provided in an expressed sequence tag (EST) database, such as that available from GenBank. Searches for overlapping ESTs may generally be performed using well known programs (*e.g.,* NCBI BLAST searches), and such ESTs may be used to generate a contiguous full length sequence. Full length DNA sequences may also be obtained by analysis of genomic fragments.

Certain nucleic acid sequences of cDNA molecules encoding portions of breast tumor proteins are provided in SEQ ID NO: 1–175, 178, 180 and 182-468. The

isolation of these sequences is described in detail below.

Polynucleotide variants may generally be prepared by any method known in the art, including chemical synthesis by, for example, solid phase phosphoramidite chemical synthesis. Modifications in a polynucleotide sequence may also be introduced using standard mutagenesis techniques, such as oligonucleotide-directed site-specific mutagenesis (see Adelman et al., DNA 2:183, 1983). Alternatively, RNA molecules may be generated by in vitro or in vivo transcription of DNA sequences encoding a breast tumor protein, or portion thereof, provided that the DNA is incorporated into a vector with a suitable RNA polymerase promoter (such as T7 or SP6). Certain portions may be used to prepare an encoded polypeptide, as described herein. In addition, or alternatively, a portion may be administered to a patient such that the encoded polypeptide is generated in vivo (e.g., by transfecting antigen-presenting cells, such as dendritic cells, with a cDNA construct encoding a breast tumor polypeptide, and administering the transfected cells to the patient).

A portion of a sequence complementary to a coding sequence (i.e., an antisense polynucleotide) may also be used as a probe or to modulate gene expression. cDNA constructs that can be transcribed into antisense RNA may also be introduced into cells of tissues to facilitate the production of antisense RNA. An antisense polynucleotide may be used, as described herein, to inhibit expression of a tumor protein. Antisense technology can be used to control gene expression through triple-helix formation, which compromises the ability of the double helix to open sufficiently for the binding of polymerases, transcription factors or regulatory molecules (see Gee et al., In Huber and Carr, Molecular and Immunologic Approaches, Futura Publishing Co. (Mt. Kisco, NY; 1994)). Alternatively, an antisense molecule may be designed to hybridize with a control region of a gene (e.g., promoter, enhancer or transcription initiation site), and block transcription of the gene; or to block translation by inhibiting binding of a transcript to ribosomes.

A portion of a coding sequence, or of a complementary sequence, may also be designed as a probe or primer to detect gene expression. Probes may be labeled with a variety of reporter groups, such as radionuclides and enzymes. and are preferably at least 10 nucleotides in length, more preferably at least 20 nucleotides in length and

still more preferably at least 30 nucleotides in length. Primers, as noted above, are preferably 22-30 nucleotides in length.

Any polynucleotide may be further modified to increase stability *in vivo*. Possible modifications include, but are not limited to, the addition of flanking sequences at the 5' and/or 3' ends; the use of phosphorothioate or 2' O-methyl rather than phosphodiesterase linkages in the backbone; and/or the inclusion of nontraditional bases such as inosine, queosine and wybutosine, as well as acetyl-, methyl-, thio- and other modified forms of adenine, cytidine, guanine, thymine and uridine.

Nucleotide sequences as described herein may be joined to a variety of other nucleotide sequences using established recombinant DNA techniques. For example, a polynucleotide may be cloned into any of a variety of cloning vectors, including plasmids, phagemids, lambda phage derivatives and cosmids. Vectors of particular interest include expression vectors, replication vectors, probe generation vectors and sequencing vectors. In general, a vector will contain an origin of replication functional in at least one organism, convenient restriction endonuclease sites and one or more selectable markers. Other elements will depend upon the desired use, and will be apparent to those of ordinary skill in the art.

Within certain embodiments, polynucleotides may be formulated so as to permit entry into a cell of a mammal, and expression therein. Such formulations are particularly useful for therapeutic purposes, as described below. Those of ordinary skill in the art will appreciate that there are many ways to achieve expression of a polynucleotide in a target cell, and any suitable method may be employed. For example, a polynucleotide may be incorporated into a viral vector such as, but not limited to, adenovirus, adeno-associated virus, retrovirus, or vaccinia or other pox virus (*e.g.,* avian pox virus). The polynucleotides may also be administered as naked plasmid vectors. Techniques for incorporating DNA into such vectors are well known to those of ordinary skill in the art. A retroviral vector may additionally transfer or incorporate a gene for a selectable marker (to aid in the identification or selection of transduced cells) and/or a targeting moiety, such as a gene that encodes a ligand for a receptor on a specific target cell, to render the vector target specific. Targeting may also be accomplished using an antibody, by methods known to those of ordinary skill in the art.

Other formulations for therapeutic purposes include colloidal dispersion systems, such as macromolecule complexes, nanocapsules, microspheres, beads, and lipid-based systems including oil-in-water emulsions, micelles, mixed micelles, and liposomes. A preferred colloidal system for use as a delivery vehicle *in vitro* and *in vivo* is a liposome (*i.e.,* an artificial membrane vesicle). The preparation and use of such systems is well known in the art.

BREAST TUMOR POLYPEPTIDES

Within the context of the present invention, polypeptides may comprise at least an immunogenic portion of a breast tumor protein or a variant thereof, as described herein. As noted above, a "breast tumor protein" is a protein that is expressed by breast tumor cells. Proteins that are breast tumor proteins also react detectably within an immunoassay (such as an ELISA) with antisera from a patient with breast cancer. Polypeptides as described herein may be of any length. Additional sequences derived from the native protein and/or heterologous sequences may be present, and such sequences may (but need not) possess further immunogenic or antigenic properties.

An "immunogenic portion," as used herein is a portion of a protein that is

recognized (*i.e.*, specifically bound) by a B-cell and/or T-cell surface antigen receptor. Such immunogenic portions generally comprise at least 5 amino acid residues, more preferably at least 10, and still more preferably at least 20 amino acid residues of a breast tumor protein or a variant thereof. Certain preferred immunogenic portions include peptides in which an N-terminal leader sequence and/or transmembrane domain have been deleted. Other preferred immunogenic portions may contain a small N- and/or C-terminal deletion (*e.g.*, 1-30 amino acids, preferably 5-15 amino acids), relative to the mature protein.

Immunogenic portions may generally be identified using well known techniques, such as those summarized in Paul, *Fundamental Immunology*, 3rd ed., 243-247 (Raven Press, 1993) and references cited therein. Such techniques include screening polypeptides for the ability to react with antigen-specific antibodies, antisera and/or T-cell lines or clones. As used herein, antisera and antibodies are "antigen-specific" if they specifically bind to an antigen (*i.e.*, they react with the protein in an ELISA or other immunoassay, and do not react detectably with unrelated proteins). Such antisera and antibodies may be prepared as described herein, and using well known techniques. An immunogenic portion of a native breast tumor protein is a portion that reacts with such antisera and/or T-cells at a level that is not substantially less than the reactivity of the full length polypeptide (*e.g.*, in an ELISA and/or T-cell reactivity assay). Such immunogenic portions may react within such assays at a level that is similar to or greater than the reactivity of the full length polypeptide. Such screens may generally be performed using methods well known to those of ordinary skill in the art, such as those described in Harlow and Lane, *Antibodies: A Laboratory Manual*, Cold Spring Harbor Laboratory, 1988. For example, a polypeptide may be immobilized on a solid support and contacted with patient sera to allow binding of antibodies within the sera to the immobilized polypeptide. Unbound sera may then be removed and bound antibodies detected using, for example, ^{125}I-labeled Protein A.

As noted above, a composition may comprise a variant of a native breast tumor protein. A polypeptide "variant," as used herein, is a polypeptide that differs from a native breast tumor protein in one or more substitutions, deletions, additions and/or insertions, such that the immunogenicity of the polypeptide is not substantially

diminished. In other words, the ability of a variant to react with antigen-specific antisera may be enhanced or unchanged, relative to the native protein, or may be diminished by less than 50%, and preferably less than 20%, relative to the native protein. Such variants may generally be identified by modifying one of the above polypeptide sequences and evaluating the reactivity of the modified polypeptide with antigen-specific antibodies or antisera as described herein. Preferred variants include those in which one or more portions, such as an N-terminal leader sequence or transmembrane domain, have been removed. Other preferred variants include variants in which a small portion (e.g., 1-30 amino acids, preferably 5-15 amino acids) has been removed from the N- and/or C-terminal of the mature protein.

Polypeptide variants preferably exhibit at least about 70%, more preferably at least about 90% and most preferably at least about 95% identity (determined as described above) to the identified polypeptides.

Preferably, a variant contains conservative substitutions. A "conservative substitution" is one in which an amino acid is substituted for another amino acid that has similar properties, such that one skilled in the art of peptide chemistry would expect the secondary structure and hydropathic nature of the polypeptide to be substantially unchanged. Amino acid substitutions may generally be made on the basis of similarity in polarity, charge, solubility, hydrophobicity, hydrophilicity and/or the amphipathic nature of the residues. For example, negatively charged amino acids include aspartic acid and glutamic acid; positively charged amino acids include lysine and arginine; and amino acids with uncharged polar head groups having similar hydrophilicity values include leucine, isoleucine and valine; glycine and alanine; asparagine and glutamine; and serine, threonine, phenylalanine and tyrosine. Other groups of amino acids that may represent conservative changes include: (1) ala, pro, gly, glu, asp, gln, asn, ser, thr; (2) cys, ser, tyr, thr; (3) val, ile, leu, met, ala, phe; (4) lys, arg, his; and (5) phe, tyr, trp, his. A variant may also, or alternatively, contain nonconservative changes. In a preferred embodiment, variant polypeptides differ from a native sequence by substitution, deletion or addition of five amino acids or fewer. Variants may also (or alternatively) be modified by, for example, the deletion or addition of amino acids that have minimal influence on the immunogenicity, secondary structure and hydropathic nature of the polypeptide.

As noted above, polypeptides may comprise a signal (or leader) sequence at the N-terminal end of the protein which co-translationally or post-translationally directs transfer of the protein. The polypeptide may also be conjugated to a linker or other sequence for ease of synthesis, purification or identification of the polypeptide (*e.g.*, poly-His), or to enhance binding of the polypeptide to a solid support. For example, a polypeptide may be conjugated to an immunoglobulin Fc region.

Polypeptides may be prepared using any of a variety of well known techniques. Recombinant polypeptides encoded by DNA sequences as described above may be readily prepared from the DNA sequences using any of a variety of expression vectors known to those of ordinary skill in the art. Expression may be achieved in any appropriate host cell that has been transformed or transfected with an expression vector containing a DNA molecule that encodes a recombinant polypeptide. Suitable host cells include prokaryotes, yeast, higher eukaryotic and plant cells. Preferably, the host cells employed are *E. coli*, yeast or a mammalian cell line such as COS or CHO. Supernatants from suitable host/vector systems which secrete recombinant protein or polypeptide into culture media may be first concentrated using a commercially available filter. Following concentration, the concentrate may be applied to a suitable purification matrix such as an affinity matrix or an ion exchange resin. Finally, one or more reverse phase HPLC steps can be employed to further purify a recombinant polypeptide.

Portions and other variants having fewer than about 100 amino acids, and generally fewer than about 50 amino acids, may also be generated by synthetic means, using techniques well known to those of ordinary skill in the art. For example, such polypeptides may be synthesized using any of the commercially available solid-phase techniques, such as the Merrifield solid-phase synthesis method, where amino acids are sequentially added to a growing amino acid chain. *See* Merrifield, *J. Am. Chem. Soc. 85*:2149-2146, 1963. Equipment for automated synthesis of polypeptides is commercially available from suppliers such as Perkin Elmer/Applied BioSystems Division (Foster City, CA), and may be operated according to the manufacturer's instructions.

Within certain specific embodiments, a polypeptide may be a fusion protein that comprises multiple polypeptides as described herein, or that comprises at

least one polypeptide as described herein and an unrelated sequence, such as a known tumor protein. A fusion partner may, for example, assist in providing T helper epitopes (an immunological fusion partner), preferably T helper epitopes recognized by humans, or may assist in expressing the protein (an expression enhancer) at higher yields than the native recombinant protein. Certain preferred fusion partners are both immunological and expression enhancing fusion partners. Other fusion partners may be selected so as to increase the solubility of the protein or to enable the protein to be targeted to desired intracellular compartments. Still further fusion partners include affinity tags, which facilitate purification of the protein.

Fusion proteins may generally be prepared using standard techniques, including chemical conjugation. Preferably, a fusion protein is expressed as a recombinant protein, allowing the production of increased levels, relative to a non-fused protein, in an expression system. Briefly, DNA sequences encoding the polypeptide components may be assembled separately, and ligated into an appropriate expression vector. The 3' end of the DNA sequence encoding one polypeptide component is ligated, with or without a peptide linker, to the 5' end of a DNA sequence encoding the second polypeptide component so that the reading frames of the sequences are in phase. This permits translation into a single fusion protein that retains the biological activity of both component polypeptides.

A peptide linker sequence may be employed to separate the first and the second polypeptide components by a distance sufficient to ensure that each polypeptide folds into its secondary and tertiary structures. Such a peptide linker sequence is incorporated into the fusion protein using standard techniques well known in the art. Suitable peptide linker sequences may be chosen based on the following factors: (1) their ability to adopt a flexible extended conformation; (2) their inability to adopt a secondary structure that could interact with functional epitopes on the first and second polypeptides; and (3) the lack of hydrophobic or charged residues that might react with the polypeptide functional epitopes. Preferred peptide linker sequences contain Gly, Asn and Ser residues. Other near neutral amino acids, such as Thr and Ala may also be used in the linker sequence. Amino acid sequences which may be usefully employed as linkers include those disclosed in Maratea et al., *Gene* *40*:39-46, 1985; Murphy et al.,

Proc. Natl. Acad. Sci. USA 83:8258-8262, 1986; U.S. Patent No. 4,935,233 and U.S. Patent No. 4,751,180. The linker sequence may generally be from 1 to about 50 amino acids in length. Linker sequences are not required when the first and second polypeptides have non-essential N-terminal amino acid regions that can be used to separate the functional domains and prevent steric interference.

The ligated DNA sequences are operably linked to suitable transcriptional or translational regulatory elements. The regulatory elements responsible for expression of DNA are located only 5' to the DNA sequence encoding the first polypeptides. Similarly, stop codons required to end translation and transcription termination signals are only present 3' to the DNA sequence encoding the second polypeptide.

Fusion proteins are also provided that comprise a polypeptide of the present invention together with an unrelated immunogenic protein. Preferably the immunogenic protein is capable of eliciting a recall response. Examples of such proteins include tetanus, tuberculosis and hepatitis proteins (*see*, for example, Stoute et al. *New Engl. J. Med., 336*:86-91, 1997).

Within preferred embodiments, an immunological fusion partner is derived from protein D, a surface protein of the gram-negative bacterium Haemophilus influenza B (WO 91/18926). Preferably, a protein D derivative comprises approximately the first third of the protein (*e.g.*, the first N-terminal 100-110 amino acids), and a protein D derivative may be lipidated. Within certain preferred embodiments, the first 109 residues of a Lipoprotein D fusion partner is included on the N-terminus to provide the polypeptide with additional exogenous T-cell epitopes and to increase the expression level in *E. coli* (thus functioning as an expression enhancer). The lipid tail ensures optimal presentation of the antigen to antigen presenting cells. Other fusion partners include the non-structural protein from influenzae virus, NS1 (hemaglutinin). Typically, the N-terminal 81 amino acids are used, although different fragments that include T-helper epitopes may be used.

In another embodiment, the immunological fusion partner is the protein known as LYTA, or a portion thereof (preferably a C-terminal portion). LYTA is derived from *Streptococcus pneumoniae*, which synthesizes an N-acetyl-L-alanine amidase known as amidase LYTA (encoded by the LytA gene; *Gene 43*:265-292, 1986).

LYTA is an autolysin that specifically degrades certain bonds in the peptidoglycan backbone. The C-terminal domain of the LYTA protein is responsible for the affinity to the choline or to some choline analogues such as DEAE. This property has been exploited for the development of *E. coli* C-LYTA expressing plasmids useful for expression of fusion proteins. Purification of hybrid proteins containing the C-LYTA fragment at the amino terminus has been described (*see Biotechnology 10*:795-798, 1992). Within a preferred embodiment, a repeat portion of LYTA may be incorporated into a fusion protein. A repeat portion is found in the C-terminal region starting at residue 178. A particularly preferred repeat portion incorporates residues 188-305.

In general, polypeptides (including fusion proteins) and polynucleotides as described herein are isolated. An "isolated" polypeptide or polynucleotide is one that is removed from its original environment. For example, a naturally-occurring protein is isolated if it is separated from some or all of the coexisting materials in the natural system. Preferably, such polypeptides are at least about 90% pure, more preferably at least about 95% pure and most preferably at least about 99% pure. A polynucleotide is considered to be isolated if, for example, it is cloned into a vector that is not a part of the natural environment.

BINDING AGENTS

The present invention further provides agents, such as antibodies and antigen-binding fragments thereof, that specifically bind to a breast tumor protein. As used herein, an antibody, or antigen-binding fragment thereof, is said to "specifically bind" to a breast tumor protein if it reacts at a detectable level (within, for example, an ELISA) with a breast tumor protein, and does not react detectably with unrelated proteins under similar conditions. As used herein, "binding" refers to a noncovalent association between two separate molecules such that a complex is formed. The ability to bind may be evaluated by, for example, determining a binding constant for the formation of the complex. The binding constant is the value obtained when the concentration of the complex is divided by the product of the component concentrations. In general, two compounds are said to "bind," in the context of the present invention, when the binding constant for complex formation exceeds about 10^3 L/mol. The binding constant may be

determined using methods well known in the art.

Binding agents may be further capable of differentiating between patients with and without a cancer, such as breast cancer, using the representative assays provided herein. In other words, antibodies or other binding agents that bind to a breast tumor protein will generate a signal indicating the presence of a cancer in at least about 20% of patients with the disease, and will generate a negative signal indicating the absence of the disease in at least about 90% of individuals without the cancer. To determine whether a binding agent satisfies this requirement, biological samples (*e.g.*, blood, sera, urine and/or tumor biopsies) from patients with and without a cancer (as determined using standard clinical tests) may be assayed as described herein for the presence of polypeptides that bind to the binding agent. It will be apparent that a statistically significant number of samples with and without the disease should be assayed. Each binding agent should satisfy the above criteria; however, those of ordinary skill in the art will recognize that binding agents may be used in combination to improve sensitivity.

Any agent that satisfies the above requirements may be a binding agent. For example, a binding agent may be a ribosome, with or without a peptide component, an RNA molecule or a polypeptide. In a preferred embodiment, a binding agent is an antibody or an antigen-binding fragment thereof. Antibodies may be prepared by any of a variety of techniques known to those of ordinary skill in the art. *See, e.g.,* Harlow and Lane, *Antibodies: A Laboratory Manual*, Cold Spring Harbor Laboratory, 1988. In general, antibodies can be produced by cell culture techniques, including the generation of monoclonal antibodies as described herein, or via transfection of antibody genes into suitable bacterial or mammalian cell hosts, in order to allow for the production of recombinant antibodies. In one technique, an immunogen comprising the polypeptide is initially injected into any of a wide variety of mammals (*e.g.*, mice, rats, rabbits, sheep or goats). In this step, the polypeptides of this invention may serve as the immunogen without modification. Alternatively, particularly for relatively short polypeptides, a superior immune response may be elicited if the polypeptide is joined to a carrier protein, such as bovine serum albumin or keyhole limpet hemocyanin. The immunogen is injected into the animal host, preferably according to a predetermined schedule incorporating one or more booster immunizations, and the animals are bled periodically.

Polyclonal antibodies specific for the polypeptide may then be purified from such antisera by, for example, affinity chromatography using the polypeptide coupled to a suitable solid support.

Monoclonal antibodies specific for an antigenic polypeptide of interest may be prepared, for example, using the technique of Kohler and Milstein, *Eur. J. Immunol.* *6*:511-519, 1976, and improvements thereto. Briefly, these methods involve the preparation of immortal cell lines capable of producing antibodies having the desired specificity (*i.e.*, reactivity with the polypeptide of interest). Such cell lines may be produced, for example, from spleen cells obtained from an animal immunized as described above. The spleen cells are then immortalized by, for example, fusion with a myeloma cell fusion partner, preferably one that is syngeneic with the immunized animal. A variety of fusion techniques may be employed. For example, the spleen cells and myeloma cells may be combined with a nonionic detergent for a few minutes and then plated at low density on a selective medium that supports the growth of hybrid cells, but not myeloma cells. A preferred selection technique uses HAT (hypoxanthine, aminopterin, thymidine) selection. After a sufficient time, usually about 1 to 2 weeks, colonies of hybrids are observed. Single colonies are selected and their culture supernatants tested for binding activity against the polypeptide. Hybridomas having high reactivity and specificity are preferred.

Monoclonal antibodies may be isolated from the supernatants of growing hybridoma colonies. In addition, various techniques may be employed to enhance the yield, such as injection of the hybridoma cell line into the peritoneal cavity of a suitable vertebrate host, such as a mouse. Monoclonal antibodies may then be harvested from the ascites fluid or the blood. Contaminants may be removed from the antibodies by conventional techniques, such as chromatography, gel filtration, precipitation, and extraction. The polypeptides of this invention may be used in the purification process in, for example, an affinity chromatography step.

Within certain embodiments, the use of antigen-binding fragments of antibodies may be preferred. Such fragments include Fab fragments, which may be prepared using standard techniques. Briefly, immunoglobulins may be purified from rabbit serum by affinity chromatography on Protein A bead columns (Harlow and Lane,

Antibodies: A Laboratory Manual, Cold Spring Harbor Laboratory, 1988) and digested by papain to yield Fab and Fc fragments. The Fab and Fc fragments may be separated by affinity chromatography on protein A bead columns.

Monoclonal antibodies of the present invention may be coupled to one or more therapeutic agents. Suitable agents in this regard include radionuclides, differentiation inducers, drugs, toxins, and derivatives thereof. Preferred radionuclides include ^{90}Y, ^{123}I, ^{125}I, ^{131}I, ^{186}Re, ^{188}Re, ^{211}At, and ^{212}Bi. Preferred drugs include methotrexate, and pyrimidine and purine analogs. Preferred differentiation inducers include phorbol esters and butyric acid. Preferred toxins include ricin, abrin, diphtheria toxin, cholera toxin, gelonin, Pseudomonas exotoxin, Shigella toxin, and pokeweed antiviral protein.

A therapeutic agent may be coupled (*e.g.*, covalently bonded) to a suitable monoclonal antibody either directly or indirectly (*e.g.*, via a linker group). A direct reaction between an agent and an antibody is possible when each possesses a substituent capable of reacting with the other. For example, a nucleophilic group, such as an amino or sulfhydryl group, on one may be capable of reacting with a carbonyl-containing group, such as an anhydride or an acid halide, or with an alkyl group containing a good leaving group (*e.g.*, a halide) on the other.

Alternatively, it may be desirable to couple a therapeutic agent and an antibody via a linker group. A linker group can function as a spacer to distance an antibody from an agent in order to avoid interference with binding capabilities. A linker group can also serve to increase the chemical reactivity of a substituent on an agent or an antibody, and thus increase the coupling efficiency. An increase in chemical reactivity may also facilitate the use of agents, or functional groups on agents, which otherwise would not be possible.

It will be evident to those skilled in the art that a variety of bifunctional or polyfunctional reagents, both homo- and hetero-functional (such as those described in the catalog of the Pierce Chemical Co., Rockford, IL), may be employed as the linker group. Coupling may be effected, for example, through amino groups, carboxyl groups, sulfhydryl groups or oxidized carbohydrate residues. There are numerous references describing such methodology, *e.g.*, U.S. Patent No. 4,671,958, to Rodwell et al.

Where a therapeutic agent is more potent when free from the antibody portion of the immunoconjugates of the present invention, it may be desirable to use a linker group which is cleavable during or upon internalization into a cell. A number of different cleavable linker groups have been described. The mechanisms for the intracellular release of an agent from these linker groups include cleavage by reduction of a disulfide bond (e.g., U.S. Patent No. 4,489,710, to Spitler), by irradiation of a photolabile bond (e.g., U.S. Patent No. 4,625,014, to Senter et al.), by hydrolysis of derivatized amino acid side chains (e.g., U.S. Patent No. 4,638,045, to Kohn et al.), by serum complement-mediated hydrolysis (e.g., U.S. Patent No. 4,671,958, to Rodwell et al.), and acid-catalyzed hydrolysis (e.g., U.S. Patent No. 4,569,789, to Blattler et al.).

It may be desirable to couple more than one agent to an antibody. In one embodiment, multiple molecules of an agent are coupled to one antibody molecule. In another embodiment, more than one type of agent may be coupled to one antibody. Regardless of the particular embodiment, immunoconjugates with more than one agent may be prepared in a variety of ways. For example, more than one agent may be coupled directly to an antibody molecule, or linkers which provide multiple sites for attachment can be used. Alternatively, a carrier can be used.

A carrier may bear the agents in a variety of ways, including covalent bonding either directly or via a linker group. Suitable carriers include proteins such as albumins (e.g., U.S. Patent No. 4,507,234, to Kato et al.), peptides and polysaccharides such as aminodextran (e.g., U.S. Patent No. 4,699,784, to Shih et al.). A carrier may also bear an agent by noncovalent bonding or by encapsulation, such as within a liposome vesicle (e.g., U.S. Patent Nos. 4,429,008 and 4,873,088). Carriers specific for radionuclide agents include radiohalogenated small molecules and chelating compounds. For example, U.S. Patent No. 4,735,792 discloses representative radiohalogenated small molecules and their synthesis. A radionuclide chelate may be formed from chelating compounds that include those containing nitrogen and sulfur atoms as the donor atoms for binding the metal, or metal oxide, radionuclide. For example, U.S. Patent No. 4,673,562, to Davison et al. discloses representative chelating compounds and their synthesis.

A variety of routes of administration for the antibodies and

immunoconjugates may be used. Typically, administration will be intravenous, intramuscular, subcutaneous or in the bed of a resected tumor. It will be evident that the precise dose of the antibody/immunoconjugate will vary depending upon the antibody used, the antigen density on the tumor, and the rate of clearance of the antibody.

T CELLS

Immunotherapeutic compositions may also, or alternatively, comprise T cells specific for a breast tumor protein. Such cells may generally be prepared *in vitro* or *ex vivo*, using standard procedures. For example, T cells may be isolated from bone marrow, peripheral blood, or a fraction of bone marrow or peripheral blood of a patient, using a commercially available cell separation system, such as the ISOLEX™ system, available from Nexell Therapeutics Inc., Irvine, CA (see also U.S. Patent No. 5,240,856; U.S. Patent No. 5,215,926; WO 89/06280; WO 91/16116 and WO 92/07243). Alternatively, T cells may be derived from related or unrelated humans, non-human mammals, cell lines or cultures.

T cells may be stimulated with a breast tumor polypeptide, polynucleotide encoding a breast tumor polypeptide and/or an antigen presenting cell (APC) that expresses such a polypeptide. Such stimulation is performed under conditions and for a time sufficient to permit the generation of T cells that are specific for the polypeptide. Preferably, a breast tumor polypeptide or polynucleotide is present within a delivery vehicle, such as a microsphere, to facilitate the generation of specific T cells.

T cells are considered to be specific for a breast tumor polypeptide if the T cells kill target cells coated with the polypeptide or expressing a gene encoding the polypeptide. T cell specificity may be evaluated using any of a variety of standard techniques. For example, within a chromium release assay or proliferation assay, a stimulation index of more than two fold increase in lysis and/or proliferation, compared to negative controls, indicates T cell specificity. Such assays may be performed, for example, as described in Chen et al., *Cancer Res. 54*:1065-1070, 1994. Alternatively, detection of the proliferation of T cells may be accomplished by a variety of known techniques. For example, T cell proliferation can be detected by measuring an increased

rate of DNA synthesis (*e.g.*, by pulse-labeling cultures of T cells with tritiated thymidine and measuring the amount of tritiated thymidine incorporated into DNA). Contact with a breast tumor polypeptide (100 ng/ml - 100 µg/ml, preferably 200 ng/ml - 25 µg/ml) for 3 - 7 days should result in at least a two fold increase in proliferation of the T cells. Contact as described above for 2-3 hours should result in activation of the T cells, as measured using standard cytokine assays in which a two fold increase in the level of cytokine release (*e.g.*, TNF or IFN-γ) is indicative of T cell activation (*see* Coligan et al., Current Protocols in Immunology, vol. 1, Wiley Interscience (Greene 1998)). T cells that have been activated in response to a breast tumor polypeptide, polynucleotide or polypeptide-expressing APC may be $CD4^+$ and/or $CD8^+$. Breast tumor protein-specific T cells may be expanded using standard techniques. Within preferred embodiments, the T cells are derived from either a patient or a related, or unrelated, donor and are administered to the patient following stimulation and expansion.

For therapeutic purposes, $CD4^+$ or $CD8^+$ T cells that proliferate in response to a breast tumor polypeptide, polynucleotide or APC can be expanded in number either *in vitro* or *in vivo*. Proliferation of such T cells *in vitro* may be accomplished in a variety of ways. For example, the T cells can be re-exposed to a breast tumor polypeptide, or a short peptide corresponding to an immunogenic portion of such a polypeptide, with or without the addition of T cell growth factors, such as interleukin-2, and/or stimulator cells that synthesize a breast tumor polypeptide. Alternatively, one or more T cells that proliferate in the presence of a breast tumor protein can be expanded in number by cloning. Methods for cloning cells are well known in the art, and include limiting dilution.

PHARMACEUTICAL COMPOSITIONS AND VACCINES

Within certain aspects, polypeptides, polynucleotides, T cells and/or binding agents disclosed herein may be incorporated into pharmaceutical compositions or immunogenic compositions (*i.e.*, vaccines). Pharmaceutical compositions comprise one or more such compounds and a physiologically acceptable carrier. Vaccines may comprise one or more such compounds and an immunostimulant. An immunostimulant

may be any substance that enhances an immune response to an exogenous antigen. Examples of immunostimulants include adjuvants, biodegradable microspheres (*e.g.*, polylactic galactide) and liposomes (into which the compound is incorporated; *see e.g.*, Fullerton, U.S. Patent No. 4,235,877). Vaccine preparation is generally described in, for example, M.F. Powell and M.J. Newman, eds., "Vaccine Design (the subunit and adjuvant approach)," Plenum Press (NY, 1995). Pharmaceutical compositions and vaccines within the scope of the present invention may also contain other compounds, which may be biologically active or inactive. For example, one or more immunogenic portions of other tumor antigens may be present, either incorporated into a fusion polypeptide or as a separate compound, within the composition or vaccine.

A pharmaceutical composition or vaccine may contain DNA encoding one or more of the polypeptides as described above, such that the polypeptide is generated *in situ*. As noted above, the DNA may be present within any of a variety of delivery systems known to those of ordinary skill in the art, including nucleic acid expression systems, bacteria and viral expression systems. Numerous gene delivery techniques are well known in the art, such as those described by Rolland, *Crit. Rev. Therap. Drug Carrier Systems 15*:143-198, 1998, and references cited therein. Appropriate nucleic acid expression systems contain the necessary DNA sequences for expression in the patient (such as a suitable promoter and terminating signal). Bacterial delivery systems involve the administration of a bacterium (such as *Bacillus-Calmette-Guerrin*) that expresses an immunogenic portion of the polypeptide on its cell surface or secretes such an epitope. In a preferred embodiment, the DNA may be introduced using a viral expression system (*e.g.*, vaccinia or other pox virus, retrovirus, or adenovirus), which may involve the use of a non-pathogenic (defective), replication competent virus. Suitable systems are disclosed, for example, in Fisher-Hoch et al., *Proc. Natl. Acad. Sci. USA 86*:317-321, 1989; Flexner et al., *Ann. N.Y. Acad. Sci. 569*:86-103, 1989; Flexner et al., *Vaccine 8*:17-21, 1990; U.S. Patent Nos. 4,603,112, 4,769,330, and 5,017,487; WO 89/01973; U.S. Patent No. 4,777,127; GB 2,200,651; EP 0,345,242; WO 91/02805; Berkner, *Biotechniques 6*:616-627, 1988; Rosenfeld et al., *Science 252*:431-434, 1991; Kolls et al., *Proc. Natl. Acad. Sci. USA 91*:215-219, 1994; Kass-Eisler et al., *Proc. Natl. Acad. Sci. USA 90*:11498-11502, 1993; Guzman et al., *Circulation 88*:2838-2848, 1993;

and Guzman et al., *Cir. Res.* 73:1202-1207, 1993. Techniques for incorporating DNA into such expression systems are well known to those of ordinary skill in the art. The DNA may also be "naked," as described, for example, in Ulmer et al., *Science 259*:1745-1749, 1993 and reviewed by Cohen, *Science 259*:1691-1692, 1993. The uptake of naked DNA may be increased by coating the DNA onto biodegradable beads, which are efficiently transported into the cells.

While any suitable carrier known to those of ordinary skill in the art may be employed in the pharmaceutical compositions of this invention, the type of carrier will vary depending on the mode of administration. Compositions of the present invention may be formulated for any appropriate manner of administration, including for example, topical, oral, nasal, intravenous, intracranial, intraperitoneal, subcutaneous or intramuscular administration. For parenteral administration, such as subcutaneous injection, the carrier preferably comprises water, saline, alcohol, a fat, a wax or a buffer. For oral administration, any of the above carriers or a solid carrier, such as mannitol, lactose, starch, magnesium stearate, sodium saccharine, talcum, cellulose, glucose, sucrose, and magnesium carbonate, may be employed. Biodegradable microspheres (*e.g.*, polylactate polyglycolate) may also be employed as carriers for the pharmaceutical compositions of this invention. Suitable biodegradable microspheres are disclosed, for example, in U.S. Patent Nos. 4,897,268 and 5,075,109.

Such compositions may also comprise buffers (*e.g.*, neutral buffered saline or phosphate buffered saline), carbohydrates (*e.g.*, glucose, mannose, sucrose or dextrans), mannitol, proteins, polypeptides or amino acids such as glycine, antioxidants, chelating agents such as EDTA or glutathione, adjuvants (*e.g.*, aluminum hydroxide) and/or preservatives. Alternatively, compositions of the present invention may be formulated as a lyophilizate. Compounds may also be encapsulated within liposomes using well known technology.

Any of a variety of immunostimulants may be employed in the vaccines of this invention. For example, an adjuvant may be included. Most adjuvants contain a substance designed to protect the antigen from rapid catabolism, such as aluminum hydroxide or mineral oil, and a stimulator of immune responses, such as lipid A, *Bortadella pertussis* or *Mycobacterium tuberculosis* derived proteins. Suitable adjuvants

are commercially available as, for example, Freund's Incomplete Adjuvant and Complete Adjuvant (Difco Laboratories, Detroit, MI); Merck Adjuvant 65 (Merck and Company, Inc., Rahway, NJ); aluminum salts such as aluminum hydroxide gel (alum) or aluminum phosphate; salts of calcium, iron or zinc; an insoluble suspension of acylated tyrosine; acylated sugars; cationically or anionically derivatized polysaccharides; polyphosphazenes; biodegradable microspheres; monophosphoryl lipid A and quil A. Cytokines, such as GM-CSF or interleukin-2, -7, or -12, may also be used as adjuvants.

Within the vaccines provided herein, the adjuvant composition is preferably designed to induce an immune response predominantly of the Th1 type. High levels of Th1-type cytokines (*e.g.,* IFN-γ, TNF-α, IL-2 and IL-12) tend to favor the induction of cell mediated immune responses to an administered antigen. In contrast, high levels of Th2-type cytokines (*e.g.,* IL-4, IL-5, IL-6 and IL-10) tend to favor the induction of humoral immune responses. Following application of a vaccine as provided herein, a patient will support an immune response that includes Th1- and Th2-type responses. Within a preferred embodiment, in which a response is predominantly Th1-type, the level of Th1-type cytokines will increase to a greater extent than the level of Th2-type cytokines. The levels of these cytokines may be readily assessed using standard assays. For a review of the families of cytokines, see Mosmann and Coffman, *Ann. Rev. Immunol.* 7:145-173, 1989.

Preferred adjuvants for use in eliciting a predominantly Th1-type response include, for example, a combination of monophosphoryl lipid A, preferably 3-de-O-acylated monophosphoryl lipid A (3D-MPL), together with an aluminum salt. MPL adjuvants are available from Ribi ImmunoChem Research Inc. (Hamilton, MT) (*see* US Patent Nos. 4,436,727; 4,877,611; 4,866,034 and 4,912,094). CpG-containing oligonucleotides (in which the CpG dinucleotide is unmethylated) also induce a predominantly Th1 response. Such oligonucleotides are well known and are described, for example, in WO 96/02555. Another preferred adjuvant is a saponin, preferably QS21, which may be used alone or in combination with other adjuvants. For example, an enhanced system involves the combination of a monophosphoryl lipid A and saponin derivative, such as the combination of QS21 and 3D-MPL as described in WO 94/00153,

or a less reactogenic composition where the QS21 is quenched with cholesterol, as described in WO 96/33739. Other preferred formulations comprises an oil-in-water emulsion and tocopherol. A particularly potent adjuvant formulation involving QS21, 3D-MPL and tocopherol in an oil-in-water emulsion is described in WO 95/17210. Any vaccine provided herein may be prepared using well known methods that result in a combination of antigen, immune response enhancer and a suitable carrier or excipient.

The compositions described herein may be administered as part of a sustained release formulation (*i.e.*, a formulation such as a capsule, sponge or gel (composed of polysaccharides, for example) that effects a slow release of compound following administration). Such formulations may generally be prepared using well known technology and administered by, for example, oral, rectal or subcutaneous implantation, or by implantation at the desired target site. Sustained-release formulations may contain a polypeptide, polynucleotide or antibody dispersed in a carrier matrix and/or contained within a reservoir surrounded by a rate controlling membrane. Carriers for use within such formulations are biocompatible, and may also be biodegradable; preferably the formulation provides a relatively constant level of active component release. The amount of active compound contained within a sustained release formulation depends upon the site of implantation, the rate and expected duration of release and the nature of the condition to be treated or prevented.

Any of a variety of delivery vehicles may be employed within pharmaceutical compositions and vaccines to facilitate production of an antigen-specific immune response that targets tumor cells. Delivery vehicles include antigen presenting cells (APCs), such as dendritic cells, macrophages, B cells, monocytes and other cells that may be engineered to be efficient APCs. Such cells may, but need not, be genetically modified to increase the capacity for presenting the antigen, to improve activation and/or maintenance of the T cell response, to have anti-tumor effects *per se* and/or to be immunologically compatible with the receiver (*i.e.*, matched HLA haplotype). APCs may generally be isolated from any of a variety of biological fluids and organs, including tumor and peritumoral tissues, and may be autologous, allogeneic, syngeneic or xenogeneic cells.

Certain preferred embodiments of the present invention use dendritic cells

or progenitors thereof as antigen-presenting cells. Dendritic cells are highly potent APCs (Banchereau and Steinman, *Nature 392*:245-251, 1998) and have been shown to be effective as a physiological adjuvant for eliciting prophylactic or therapeutic antitumor immunity (*see* Timmerman and Levy, *Ann. Rev. Med. 50*:507-529, 1999). In general, dendritic cells may be identified based on their typical shape (stellate *in situ*, with marked cytoplasmic processes (dendrites) visible *in vitro*), their ability to take up, process and present antigens with high efficiency, and their ability to activate naïve T cell responses. Dendritic cells may, of course, be engineered to express specific cell-surface receptors or ligands that are not commonly found on dendritic cells *in vivo* or *ex vivo*, and such modified dendritic cells are contemplated by the present invention. As an alternative to dendritic cells, secreted vesicles antigen-loaded dendritic cells (called exosomes) may be used within a vaccine (*see* Zitvogel et al., *Nature Med. 4*:594-600, 1998).

Dendritic cells and progenitors may be obtained from peripheral blood, bone marrow, tumor-infiltrating cells, peritumoral tissues-infiltrating cells, lymph nodes, spleen, skin, umbilical cord blood or any other suitable tissue or fluid. For example, dendritic cells may be differentiated *ex vivo* by adding a combination of cytokines such as GM-CSF, IL-4, IL-13 and/or TNFα to cultures of monocytes harvested from peripheral blood. Alternatively, CD34 positive cells harvested from peripheral blood, umbilical cord blood or bone marrow may be differentiated into dendritic cells by adding to the culture medium combinations of GM-CSF, IL-3, TNFα, CD40 ligand, LPS, flt3 ligand and/or other compound(s) that induce differentiation, maturation and proliferation of dendritic cells.

Dendritic cells are conveniently categorized as "immature" and "mature" cells, which allows a simple way to discriminate between two well characterized phenotypes. However, this nomenclature should not be construed to exclude all possible intermediate stages of differentiation. Immature dendritic cells are characterized as APC with a high capacity for antigen uptake and processing, which correlates with the high expression of Fcγ receptor and mannose receptor. The mature phenotype is typically characterized by a lower expression of these markers, but a high expression of cell

surface molecules responsible for T cell activation such as class I and class II MHC, adhesion molecules (*e.g.*, CD54 and CD11) and costimulatory molecules (*e.g.*, CD40, CD80, CD86 and 4-1BB).

APCs may generally be transfected with a polynucleotide encoding a breast tumor protein (or portion or other variant thereof) such that the breast tumor polypeptide, or an immunogenic portion thereof, is expressed on the cell surface. Such transfection may take place *ex vivo*, and a composition or vaccine comprising such transfected cells may then be used for therapeutic purposes, as described herein. Alternatively, a gene delivery vehicle that targets a dendritic or other antigen presenting cell may be administered to a patient, resulting in transfection that occurs *in vivo*. *In vivo* and *ex vivo* transfection of dendritic cells, for example, may generally be performed using any methods known in the art, such as those described in WO 97/24447, or the gene gun approach described by Mahvi et al., *Immunology and cell Biology 75*:456-460, 1997. Antigen loading of dendritic cells may be achieved by incubating dendritic cells or progenitor cells with the breast tumor polypeptide, DNA (naked or within a plasmid vector) or RNA; or with antigen-expressing recombinant bacterium or viruses (*e.g.*, vaccinia, fowlpox, adenovirus or lentivirus vectors). Prior to loading, the polypeptide may be covalently conjugated to an immunological partner that provides T cell help (*e.g.*, a carrier molecule). Alternatively, a dendritic cell may be pulsed with a non-conjugated immunological partner, separately or in the presence of the polypeptide.

CANCER THERAPY

In further aspects of the present invention, the compositions described herein may be used for immunotherapy of cancer, such as breast cancer. Within such methods, pharmaceutical compositions and vaccines are typically administered to a patient. As used herein, a "patient" refers to any warm-blooded animal, preferably a human. A patient may or may not be afflicted with cancer. Accordingly, the above pharmaceutical compositions and vaccines may be used to prevent the development of a cancer or to treat a patient afflicted with a cancer. A cancer may be diagnosed using criteria generally accepted in the art, including the presence of a malignant tumor. Pharmaceutical compositions and vaccines may be administered either prior to or

following surgical removal of primary tumors and/or treatment such as administration of radiotherapy or conventional chemotherapeutic drugs.

Within certain embodiments, immunotherapy may be active immunotherapy, in which treatment relies on the *in vivo* stimulation of the endogenous host immune system to react against tumors with the administration of immune response-modifying agents (such as polypeptides and polynucleotides disclosed herein).

Within other embodiments, immunotherapy may be passive immunotherapy, in which treatment involves the delivery of agents with established tumor-immune reactivity (such as effector cells or antibodies) that can directly or indirectly mediate antitumor effects and does not necessarily depend on an intact host immune system. Examples of effector cells include T cells as discussed above, T lymphocytes (such as CD8$^+$ cytotoxic T lymphocytes and CD4$^+$ T-helper tumor-infiltrating lymphocytes), killer cells (such as Natural Killer cells and lymphokine-activated killer cells), B cells and antigen-presenting cells (such as dendritic cells and macrophages) expressing a polypeptide provided herein. T cell receptors and antibody receptors specific for the polypeptides recited herein may be cloned, expressed and transferred into other vectors or effector cells for adoptive immunotherapy. The polypeptides provided herein may also be used to generate antibodies or anti-idiotypic antibodies (as described above and in U.S. Patent No. 4,918,164) for passive immunotherapy.

Effector cells may generally be obtained in sufficient quantities for adoptive immunotherapy by growth *in vitro*, as described herein. Culture conditions for expanding single antigen-specific effector cells to several billion in number with retention of antigen recognition *in vivo* are well known in the art. Such *in vitro* culture conditions typically use intermittent stimulation with antigen, often in the presence of cytokines (such as IL-2) and non-dividing feeder cells. As noted above, immunoreactive polypeptides as provided herein may be used to rapidly expand antigen-specific T cell cultures in order to generate a sufficient number of cells for immunotherapy. In particular, antigen-presenting cells, such as dendritic, macrophage, monocyte, fibroblast or B cells, may be pulsed with immunoreactive polypeptides or transfected with one or more polynucleotides using standard techniques well known in the art. For example,

antigen-presenting cells can be transfected with a polynucleotide having a promoter appropriate for increasing expression in a recombinant virus or other expression system. Cultured effector cells for use in therapy must be able to grow and distribute widely, and to survive long term *in vivo*. Studies have shown that cultured effector cells can be induced to grow in vivo and to survive long term in substantial numbers by repeated stimulation with antigen supplemented with IL-2 (*see*, for example, Cheever et al., *Immunological Reviews 157*:177, 1997).

Alternatively, a vector expressing a polypeptide recited herein may be introduced into antigen presenting cells taken from a patient and clonally propagated *ex vivo* for transplant back into the same patient. Transfected cells may be reintroduced into the patient using any means known in the art, preferably in sterile form by intravenous, intracavitary, intraperitoneal or intratumor administration.

Routes and frequency of administration of the therapeutic compositions disclosed herein, as well as dosage, will vary from individual to individual, and may be readily established using standard techniques. In general, the pharmaceutical compositions and vaccines may be administered by injection (*e.g.*, intracutaneous, intramuscular, intravenous or subcutaneous), intranasally (*e.g.*, by aspiration) or orally. Preferably, between 1 and 10 doses may be administered over a 52 week period. Preferably, 6 doses are administered, at intervals of 1 month, and booster vaccinations may be given periodically thereafter. Alternate protocols may be appropriate for individual patients. A suitable dose is an amount of a compound that, when administered as described above, is capable of promoting an anti-tumor immune response, and is at least 10-50% above the basal (*i.e.*, untreated) level. Such response can be monitored by measuring the anti-tumor antibodies in a patient or by vaccine-dependent generation of cytolytic effector cells capable of killing the patient's tumor cells *in vitro*. Such vaccines should also be capable of causing an immune response that leads to an improved clinical outcome (*e.g.*, more frequent remissions, complete or partial or longer disease-free survival) in vaccinated patients as compared to non-vaccinated patients. In general, for pharmaceutical compositions and vaccines comprising one or more polypeptides, the amount of each polypeptide present in a dose ranges from about 100 µg to 5 mg per kg of

host. Suitable dose sizes will vary with the size of the patient, but will typically range from about 0.1 mL to about 5 mL.

In general, an appropriate dosage and treatment regimen provides the active compound(s) in an amount sufficient to provide therapeutic and/or prophylactic benefit. Such a response can be monitored by establishing an improved clinical outcome (e.g., more frequent remissions, complete or partial, or longer disease-free survival) in treated patients as compared to non-treated patients. Increases in preexisting immune responses to a breast tumor protein generally correlate with an improved clinical outcome. Such immune responses may generally be evaluated using standard proliferation, cytotoxicity or cytokine assays, which may be performed using samples obtained from a patient before and after treatment.

METHODS FOR DETECTING CANCER

In general, a cancer may be detected in a patient based on the presence of one or more breast tumor proteins and/or polynucleotides encoding such proteins in a biological sample (for example, blood, sera, urine and/or tumor biopsies) obtained from the patient. In other words, such proteins may be used as markers to indicate the presence or absence of a cancer such as breast cancer. In addition, such proteins may be useful for the detection of other cancers. The binding agents provided herein generally permit detection of the level of antigen that binds to the agent in the biological sample. Polynucleotide primers and probes may be used to detect the level of mRNA encoding a tumor protein, which is also indicative of the presence or absence of a cancer. In general, a breast tumor sequence should be present at a level that is at least three fold higher in tumor tissue than in normal tissue

There are a variety of assay formats known to those of ordinary skill in the art for using a binding agent to detect polypeptide markers in a sample. See, e.g., Harlow and Lane, *Antibodies: A Laboratory Manual,* Cold Spring Harbor Laboratory, 1988. In general, the presence or absence of a cancer in a patient may be determined by (a) contacting a biological sample obtained from a patient with a binding agent; (b) detecting in the sample a level of polypeptide that binds to the binding agent; and (c) comparing the level of polypeptide with a predetermined cut-off value.

In a preferred embodiment, the assay involves the use of binding agent immobilized on a solid support to bind to and remove the polypeptide from the remainder of the sample. The bound polypeptide may then be detected using a detection reagent that contains a reporter group and specifically binds to the binding agent/polypeptide complex. Such detection reagents may comprise, for example, a binding agent that specifically binds to the polypeptide or an antibody or other agent that specifically binds to the binding agent, such as an anti-immunoglobulin, protein G, protein A or a lectin. Alternatively, a competitive assay may be utilized, in which a polypeptide is labeled with a reporter group and allowed to bind to the immobilized binding agent after incubation of the binding agent with the sample. The extent to which components of the sample inhibit the binding of the labeled polypeptide to the binding agent is indicative of the reactivity of the sample with the immobilized binding agent. Suitable polypeptides for use within such assays include full length breast tumor proteins and portions thereof to which the binding agent binds, as described above.

The solid support may be any material known to those of ordinary skill in the art to which the tumor protein may be attached. For example, the solid support may be a test well in a microtiter plate or a nitrocellulose or other suitable membrane. Alternatively, the support may be a bead or disc, such as glass, fiberglass, latex or a plastic material such as polystyrene or polyvinylchloride. The support may also be a magnetic particle or a fiber optic sensor, such as those disclosed, for example, in U.S. Patent No. 5,359,681. The binding agent may be immobilized on the solid support using a variety of techniques known to those of skill in the art, which are amply described in the patent and scientific literature. In the context of the present invention, the term "immobilization" refers to both noncovalent association, such as adsorption, and covalent attachment (which may be a direct linkage between the agent and functional groups on the support or may be a linkage by way of a cross-linking agent). Immobilization by adsorption to a well in a microtiter plate or to a membrane is preferred. In such cases, adsorption may be achieved by contacting the binding agent, in a suitable buffer, with the solid support for a suitable amount of time. The contact time varies with temperature, but is typically between about 1 hour and about 1 day. In general, contacting a well of a plastic microtiter plate (such as polystyrene or polyvinylchloride) with an amount of

binding agent ranging from about 10 ng to about 10 µg, and preferably about 100 ng to about 1 µg, is sufficient to immobilize an adequate amount of binding agent.

Covalent attachment of binding agent to a solid support may generally be achieved by first reacting the support with a bifunctional reagent that will react with both the support and a functional group, such as a hydroxyl or amino group, on the binding agent. For example, the binding agent may be covalently attached to supports having an appropriate polymer coating using benzoquinone or by condensation of an aldehyde group on the support with an amine and an active hydrogen on the binding partner (see, e.g., Pierce Immunotechnology Catalog and Handbook, 1991, at A12-A13).

In certain embodiments, the assay is a two-antibody sandwich assay. This assay may be performed by first contacting an antibody that has been immobilized on a solid support, commonly the well of a microtiter plate, with the sample, such that polypeptides within the sample are allowed to bind to the immobilized antibody. Unbound sample is then removed from the immobilized polypeptide-antibody complexes and a detection reagent (preferably a second antibody capable of binding to a different site on the polypeptide) containing a reporter group is added. The amount of detection reagent that remains bound to the solid support is then determined using a method appropriate for the specific reporter group.

More specifically, once the antibody is immobilized on the support as described above, the remaining protein binding sites on the support are typically blocked. Any suitable blocking agent known to those of ordinary skill in the art, such as bovine serum albumin or Tween 20™ (Sigma Chemical Co., St. Louis, MO). The immobilized antibody is then incubated with the sample, and polypeptide is allowed to bind to the antibody. The sample may be diluted with a suitable diluent, such as phosphate-buffered saline (PBS) prior to incubation. In general, an appropriate contact time (i.e., incubation time) is a period of time that is sufficient to detect the presence of polypeptide within a sample obtained from an individual with breast cancer. Preferably, the contact time is sufficient to achieve a level of binding that is at least about 95% of that achieved at equilibrium between bound and unbound polypeptide. Those of ordinary skill in the art will recognize that the time necessary to achieve equilibrium may be readily determined

by assaying the level of binding that occurs over a period of time. At room temperature, an incubation time of about 30 minutes is generally sufficient.

Unbound sample may then be removed by washing the solid support with an appropriate buffer, such as PBS containing 0.1% Tween 20™. The second antibody, which contains a reporter group, may then be added to the solid support. Preferred reporter groups include those groups recited above.

The detection reagent is then incubated with the immobilized antibody-polypeptide complex for an amount of time sufficient to detect the bound polypeptide. An appropriate amount of time may generally be determined by assaying the level of binding that occurs over a period of time. Unbound detection reagent is then removed and bound detection reagent is detected using the reporter group. The method employed for detecting the reporter group depends upon the nature of the reporter group. For radioactive groups, scintillation counting or autoradiographic methods are generally appropriate. Spectroscopic methods may be used to detect dyes, luminescent groups and fluorescent groups. Biotin may be detected using avidin, coupled to a different reporter group (commonly a radioactive or fluorescent group or an enzyme). Enzyme reporter groups may generally be detected by the addition of substrate (generally for a specific period of time), followed by spectroscopic or other analysis of the reaction products.

To determine the presence or absence of a cancer, such as breast cancer, the signal detected from the reporter group that remains bound to the solid support is generally compared to a signal that corresponds to a predetermined cut-off value. In one preferred embodiment, the cut-off value for the detection of a cancer is the average mean signal obtained when the immobilized antibody is incubated with samples from patients without the cancer. In general, a sample generating a signal that is three standard deviations above the predetermined cut-off value is considered positive for the cancer. In an alternate preferred embodiment, the cut-off value is determined using a Receiver Operator Curve, according to the method of Sackett et al., *Clinical Epidemiology: A Basic Science for Clinical Medicine*, Little Brown and Co., 1985, p. 106-7. Briefly, in this embodiment, the cut-off value may be determined from a plot of pairs of true positive rates (*i.e.*, sensitivity) and false positive rates (100%-specificity) that correspond

to each possible cut-off value for the diagnostic test result. The cut-off value on the plot that is the closest to the upper left-hand corner (*i.e.*, the value that encloses the largest area) is the most accurate cut-off value, and a sample generating a signal that is higher than the cut-off value determined by this method may be considered positive. Alternatively, the cut-off value may be shifted to the left along the plot, to minimize the false positive rate, or to the right, to minimize the false negative rate. In general, a sample generating a signal that is higher than the cut-off value determined by this method is considered positive for a cancer.

In a related embodiment, the assay is performed in a flow-through or strip test format, wherein the binding agent is immobilized on a membrane, such as nitrocellulose. In the flow-through test, polypeptides within the sample bind to the immobilized binding agent as the sample passes through the membrane. A second, labeled binding agent then binds to the binding agent-polypeptide complex as a solution containing the second binding agent flows through the membrane. The detection of bound second binding agent may then be performed as described above. In the strip test format, one end of the membrane to which binding agent is bound is immersed in a solution containing the sample. The sample migrates along the membrane through a region containing second binding agent and to the area of immobilized binding agent. Concentration of second binding agent at the area of immobilized antibody indicates the presence of a cancer. Typically, the concentration of second binding agent at that site generates a pattern, such as a line, that can be read visually. The absence of such a pattern indicates a negative result. In general, the amount of binding agent immobilized on the membrane is selected to generate a visually discernible pattern when the biological sample contains a level of polypeptide that would be sufficient to generate a positive signal in the two-antibody sandwich assay, in the format discussed above. Preferred binding agents for use in such assays are antibodies and antigen-binding fragments thereof. Preferably, the amount of antibody immobilized on the membrane ranges from about 25 ng to about 1 μg, and more preferably from about 50 ng to about 500 ng. Such tests can typically be performed with a very small amount of biological sample.

Of course, numerous other assay protocols exist that are suitable for use with the tumor proteins or binding agents of the present invention. The above descriptions are intended to be exemplary only. For example, it will be apparent to those of ordinary skill in the art that the above protocols may be readily modified to use breast tumor polypeptides to detect antibodies that bind to such polypeptides in a biological sample. The detection of such breast tumor protein specific antibodies may correlate with the presence of a cancer.

A cancer may also, or alternatively, be detected based on the presence of T cells that specifically react with a breast tumor protein in a biological sample. Within certain methods, a biological sample comprising $CD4^+$ and/or $CD8^+$ T cells isolated from a patient is incubated with a breast tumor polypeptide, a polynucleotide encoding such a polypeptide and/or an APC that expresses at least an immunogenic portion of such a polypeptide, and the presence or absence of specific activation of the T cells is detected. Suitable biological samples include, but are not limited to, isolated T cells. For example, T cells may be isolated from a patient by routine techniques (such as by Ficoll/Hypaque density gradient centrifugation of peripheral blood lymphocytes). T cells may be incubated *in vitro* for 2-9 days (typically 4 days) at 37°C with polypeptide (*e.g.*, 5 - 25 μg/ml). It may be desirable to incubate another aliquot of a T cell sample in the absence of breast tumor polypeptide to serve as a control. For $CD4^+$ T cells, activation is preferably detected by evaluating proliferation of the T cells. For $CD8^+$ T cells, activation is preferably detected by evaluating cytolytic activity. A level of proliferation that is at least two fold greater and/or a level of cytolytic activity that is at least 20% greater than in disease-free patients indicates the presence of a cancer in the patient.

As noted above, a cancer may also, or alternatively, be detected based on the level of mRNA encoding a breast tumor protein in a biological sample. For example, at least two oligonucleotide primers may be employed in a polymerase chain reaction (PCR) based assay to amplify a portion of a breast tumor cDNA derived from a biological sample, wherein at least one of the oligonucleotide primers is specific for (*i.e.*, hybridizes to) a polynucleotide encoding the breast tumor protein. The amplified cDNA is then separated and detected using techniques well known in the art, such as gel electrophoresis. Similarly, oligonucleotide probes that specifically hybridize to a polynucleotide encoding a breast tumor protein may be used in a hybridization assay to detect the presence of polynucleotide encoding the tumor protein in a biological sample.

To permit hybridization under assay conditions, oligonucleotide primers and probes should comprise an oligonucleotide sequence that has at least about 60%, preferably at least about 75% and more preferably at least about 90%, identity to a portion of a polynucleotide encoding a breast tumor protein that is at least 10 nucleotides,

and preferably at least 20 nucleotides, in length. Preferably, oligonucleotide primers and/or probes will hybridize to a polynucleotide encoding a polypeptide disclosed herein under moderately stringent conditions, as defined above. Oligonucleotide primers and/or probes which may be usefully employed in the diagnostic methods described herein preferably are at least 10-40 nucleotides in length. In a preferred embodiment, the oligonucleotide primers comprise at least 10 contiguous nucleotides, more preferably at least 15 contiguous nucleotides, of a DNA molecule having a sequence recited in SEQ ID NOS:1-175, 178, 180 and 182-468. Techniques for both PCR based assays and hybridization assays are well known in the art (see, for example, Mullis et al., *Cold Spring Harbor Symp. Quant. Biol.*, *51*:263, 1987; Erlich ed., *PCR Technology*, Stockton Press, NY, 1989).

One preferred assay employs RT-PCR, in which PCR is applied in conjunction with reverse transcription. Typically, RNA is extracted from a biological sample, such as biopsy tissue, and is reverse transcribed to produce cDNA molecules. PCR amplification using at least one specific primer generates a cDNA molecule, which may be separated and visualized using, for example, gel electrophoresis. Amplification may be performed on biological samples taken from a test patient and from an individual who is not afflicted with a cancer. The amplification reaction may be performed on several dilutions of cDNA spanning two orders of magnitude. A two-fold or greater increase in expression in several dilutions of the test patient sample as compared to the same dilutions of the non-cancerous sample is typically considered positive.

In another embodiment, the disclosed compositions may be used as markers for the progression of cancer. In this embodiment, assays as described above for the diagnosis of a cancer may be performed over time, and the change in the level of, reactive polypeptide(s) or polynucleotide evaluated. For example, the assays may be performed every 24-72 hours for a period of 6 months to 1 year, and thereafter performed as needed. In general, a cancer is progressing in those patients in whom the level of polypeptide or polynucleotide detected increases over time. In contrast, the cancer is not progressing when the level of reactive polypeptide or polynucleotide either remains constant or decreases with time.

Certain *in vivo* diagnostic assays may be performed directly on a tumor.

One such assay involves contacting tumor cells with a binding agent. The bound binding agent may then be detected directly or indirectly via a reporter group. Such binding agents may also be used in histological applications. Alternatively, polynucleotide probes may be used within such applications.

As noted above, to improve sensitivity, multiple breast tumor protein markers may be assayed within a given sample. It will be apparent that binding agents specific for different proteins provided herein may be combined within a single assay. Further, multiple primers or probes may be used concurrently. The selection of tumor protein markers may be based on routine experiments to determine combinations that results in optimal sensitivity. In addition, or alternatively, assays for tumor proteins provided herein may be combined with assays for other known tumor antigens.

DIAGNOSTIC KITS

The present invention further provides kits for use within any of the above diagnostic methods. Such kits typically comprise two or more components necessary for performing a diagnostic assay. Components may be compounds, reagents, containers and/or equipment. For example, one container within a kit may contain a monoclonal antibody or fragment thereof that specifically binds to a breast tumor protein. Such antibodies or fragments may be provided attached to a support material, as described above. One or more additional containers may enclose elements, such as reagents or buffers, to be used in the assay. Such kits may also, or alternatively, contain a detection reagent as described above that contains a reporter group suitable for direct or indirect detection of antibody binding.

Alternatively, a kit may be designed to detect the level of mRNA encoding a breast tumor protein in a biological sample. Such kits generally comprise at least one oligonucleotide probe or primer, as described above, that hybridizes to a polynucleotide encoding a breast tumor protein. Such an oligonucleotide may be used, for example, within a PCR or hybridization assay. Additional components that may be present within such kits include a second oligonucleotide and/or a diagnostic reagent or container to facilitate the detection of a polynucleotide encoding a breast tumor protein.

The following Examples are offered by way of illustration and not by way of limitation.

EXAMPLES

Example 1

ISOLATION AND CHARACTERIZATION OF BREAST TUMOR POLYPEPTIDES

This Example describes the isolation of breast tumor polypeptides from a breast tumor cDNA library.

A cDNA subtraction library containing cDNA from breast tumor subtracted with normal breast cDNA was constructed as follows. Total RNA was extracted from primary tissues using Trizol reagent (Gibco BRL Life Technologies, Gaithersburg, MD) as described by the manufacturer. The polyA+ RNA was purified using an oligo(dT) cellulose column according to standard protocols. First strand cDNA was synthesized using the primer supplied in a Clontech PCR-Select cDNA Subtraction Kit (Clontech, Palo Alto, CA). The driver DNA consisted of cDNAs from two normal breast tissues with the tester cDNA being from three primary breast tumors. Double-stranded cDNA was synthesized for both tester and driver, and digested with a combination of endonucleases (MluI, MscI, PvuII, SalI and StuI) which recognize six base pairs DNA. This modification increased the average cDNA size dramatically compared with cDNAs generated according to the protocol of Clontech (Palo Alto, CA). The digested tester cDNAs were ligated to two different adaptors and the subtraction was performed according to Clontech's protocol. The subtracted cDNAs were subjected to two rounds of PCR amplification, following the manufacturer's protocol. The resulting PCR products were subcloned into the TA cloning vector, pCRII (Invitrogen, San Diego, CA) and transformed into ElectroMax *E. coli* DH10B cells (Gibco BRL Life, Technologies) by electroporation. DNA was isolated from independent clones and sequenced using a Perkin Elmer/Applied Biosystems Division (Foster City, CA) Automated Sequencer Model 373A.

Sixty-three distinct cDNA clones were found in the subtracted breast tumor-specific cDNA library. The determined one strand (5' or 3') cDNA sequences for the clones are provided in SEQ ID NO: 1-61, 72 and 73, respectively. Comparison of these cDNA sequences with known sequences in the gene bank using the EMBL and GenBank databases (Release 97) revealed no significant homologies to the sequences provided in SEQ ID NO: 14, 21, 22, 27, 29, 30, 32, 38, 44, 45, 53, 72 and 73. The sequences of SEQ ID NO: 1, 3, 16, 17, 34, 48, 57, 60 and 61 were found to represent known human genes. The sequences of SEQ ID NO: 2, 4, 23, 39 and 50 were found to show some similarity to previously identified non-human genes. The remaining clones (SEQ ID NO: 5-13, 15, 18-20, 24-26, 28, 31, 33, 35-37, 40-43, 46, 47, 49, 51, 52, 54-56, 58 and 59) were found to show at least some degree of homology to previously identified expressed sequence tags (ESTs).

To determine mRNA expression levels of the isolated cDNA clones, cDNA clones from the breast subtraction described above were randomly picked and colony PCR amplified. Their mRNA expression levels in breast tumor, normal breast and various other normal tissues were determined using microarray technology (Synteni, Palo Alto, CA). Briefly, the PCR amplification products were arrayed onto slides in an array format, with each product occupying a unique location in the array. mRNA was extracted from the tissue sample to be tested, reverse transcribed, and fluorescent-labeled cDNA probes were generated. The microarrays were probed with the labeled cDNA probes, the slides scanned and fluorescence intensity was measured. Data was analyzed using Synteni provided GEMTOOLS Software. Of the seventeen cDNA clones examined, those of SEQ ID NO: 40, 46, 59 and 73 were found to be over-expressed in breast tumor and expressed at low levels in all normal tissues tested (breast, PBMC, colon, fetal tissue, salivary gland, bone marrow, lung, pancreas, large intestine, spinal cord, adrenal gland, kidney, pancreas, liver, stomach, skeletal muscle, heart, small intestine, skin, brain and human mammary epithelial cells). The clones of SEQ ID NO: 41 and 48 were found to be over-expressed in breast tumor and expressed at low levels in all other tissues tested, with the exception of bone marrow. The clone of SEQ ID NO: 42 was found to be over-expressed in breast tumor and expressed at low levels in all other tissues tested except bone marrow and spinal cord. The clone of SEQ ID NO: 43 was

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found to be over-expressed in breast tumor and expressed at low levels in all other tissues tested with the exception of spinal cord, heart and small intestine. The clone of SEQ ID NO: 51 was found to be over-expressed in breast tumor and expressed at low levels in all other tissues tested with the exception of large intestine. The clone of SEQ ID NO: 54 was found to be over-expressed in breast tumor and expressed at low levels in all other tissues tested with the exception of PBMC, stomach and small intestine. The clone of SEQ ID NO: 56 was found to be over-expressed in breast tumor and expressed at low levels in all other tissues tested with the exception of large and small intestine, human mammary epithelia cells and SCID mouse-passaged breast tumor. The clone of SEQ ID NO: 60 was found to be over-expressed in breast tumor and expressed at low levels in all other tissues tested with the exception of spinal cord and heart. The clone of SEQ ID NO: 61 was found to be over-expressed in breast tumor and expressed at low levels in all other tissues tested with the exception of small intestine. The clone of SEQ ID NO: 72 was found to be over-expressed in breast tumor and expressed at low levels in all other tissues tested with the exception of colon and salivary gland.

The results of a Northern blot analysis of the clone SYN18C6 (SEQ ID NO: 40) are shown in Fig. 1. A predicted protein sequence encoded by SYN18C6 is provided in SEQ ID NO: 62.

Additional cDNA clones that are over-expressed in breast tumor tissue were isolated from breast cDNA subtraction libraries as follows. Breast subtraction libraries were prepared, as described above, by PCR-based subtraction employing pools of breast tumor cDNA as the tester and pools of either normal breast cDNA or cDNA from other normal tissues as the driver. cDNA clones from breast subtraction were randomly picked and colony PCR amplified and their mRNA expression levels in breast tumor, normal breast and various other normal tissues were determined using the microarray technology described above. Twenty-four distinct cDNA clones were found to be over-expressed in breast tumor and expressed at low levels in all normal tissues tested (breast, brain, liver, pancreas, lung, salivary gland, stomach, colon, kidney, bone marrow, skeletal muscle, PBMC, heart, small intestine, adrenal gland, spinal cord, large intestine and skin). The determined partial cDNA sequences for these clones are provided in SEQ ID NO: 63-87. Comparison of the sequences of SEQ ID NO: 74-87

with those in the gene bank as described above, revealed homology to previously identified human genes. No significant homologies were found to the sequences of SEQ ID NO: 63-73.

Three DNA isoforms for the clone B726P (partial sequence provided in SEQ ID NO: 71) were isolated as follows. A radioactive probe was synthesized from B726P by excising B726P DNA from a pT7Blue vector (Novagen) by a BamHI/XbaI restriction digest and using the resulting DNA as the template in a single-stranded PCR in the presence of [α-32P]dCTP. The sequence of the primer employed for this PCR is provided in SEQ ID NO: 177. The resulting radioactive probe was used to probe a directional cDNA library and a random-primed cDNA library made using RNA isolated from breast tumors. Eighty-five clones were identified, excised, purified and sequenced. Of these 85 clones, three were found to each contain a significant open reading frame. The determined cDNA sequence of the isoform B726P-20 is provided in SEQ ID NO: 175, with the corresponding predicted amino acid sequence being provided in SEQ ID NO: 176. The determined cDNA sequence of the isoform B726P-74 is provided in SEQ ID NO: 178, with the corresponding predicted amino acid sequence being provided in SEQ ID NO: 179. The determined cDNA sequence of the isoform B726P-79 is provided in SEQ ID NO: 180, with the corresponding predicted amino acid sequence being provided in SEQ ID NO: 181.

Efforts to obtain a full-length clone of B726P using standard techniques led to the isolation of five additional clones that represent additional 5' sequence of B726P. These clones appear to be alternative splice forms of the same gene. The determined cDNA sequences of these clones are provided in SEQ ID NO: 464-468, with the predicted amino acid sequences encoded by SEQ ID NO: 464-467 being provided in SEQ ID NO: 470-473, respectively. Using standard computer techniques, a 3,681 bp consensus DNA sequence (SEQ ID NO: 463) was created that contains two large open reading frames. The downstream ORF encodes the predicted amino acid sequence of SEQ ID NO: 181. The predicted amino acid sequence encoded by the upstream ORF is provided in SEQ ID NO: 469.

Further isolation of individual clones that are over-expressed in breast tumor tissue was conducted using cDNA subtraction library techniques described above. In particular, a cDNA subtraction library containing cDNA from breast tumors subtracted with five other normal human tissue cDNAs (brain, liver, PBMC, pancreas and normal breast) was utilized in this screening. From the original subtraction, one hundred seventy seven clones were selected to be further characterized by DNA sequencing and microarray analysis. Microarray analysis demonstrated that the sequences in SEQ ID NO: 182-251 were 2 or more fold over-expressed in human breast tumor tissues over normal human tissues. No significant homologies were found for nineteen of these clones, including, SEQ ID NO: 185, 186, 194, 199, 205, 208, 211, 214-216, 219, 222, 226, 232, 236, 240, 241, 245 and 246, with the exception of some previously identified expressed sequence tags (ESTs). The remaining clones share some homology to previously identified genes, specifically SEQ ID NO: 181-184, 187-193, 195-198, 200-204, 206, 207, 209, 210, 212, 213, 217, 218, 220, 221, 223-225, 227-231, 233-235, 237-239, 242-244 and 247-251.

Of the seventy clones showing over-expression in breast tumor tissues, fifteen demonstrated particularly good expression levels in breast tumor over normal human tissues. The following eleven clones did not show any significant homology to any known genes. Clone 19463.1 (SEQ ID NO: 185) was over-expressed in the majority of breast tumors and also in the SCID breast tumors tested (refer to Example 2); additionally, over-expression was found in a majority of normal breast tissues. Clone 19483.1 (SEQ ID NO: 216) was over-expressed in a few breast tumors, with no over-expression in any normal tissues tested. Clone 19470.1 (SEQ ID NO: 219) was found to be slightly over-expressed in some breast tumors. Clone 19468.1 (SEQ ID NO: 222) was found to be slightly over-expressed in the majority of breast tumors tested. Clone 19505.1 (SEQ ID NO: 226) was found to be slightly over-expressed in 50% of breast tumors, as well as in SCID tumor tissues, with some degree of over-expression in found in normal breast. Clone 1509.1 (SEQ ID NO: 232) was found to be over-expressed in very few breast tumors, but with a certain degree of over-expression in metastatic breast tumor tissues, as well as no significant over-expression found in normal tissues. Clone 19513.1 (SEQ ID NO: 236) was shown to be slightly over-expressed in few breast

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tumors, with no significant over-expression levels found in normal tissues. Clone 19575.1 (SEQ ID NO: 240) showed low level over-expression in some breast tumors and also in normal breast. Clone 19560.1 (SEQ ID NO: 241) was over-expressed in 50% of breast tumors tested, as well as in some normal breast tissues. Clone 19583.1 (SEQ ID NO: 245) was slightly over-expressed in some breast tumors, with very low levels of over-expression found in normal tissues. Clone 19587.1 (SEQ ID NO: 246) showed low level over-expression in some breast tumors and no significant over-expression in normal tissues.

Clone 19520.1 (SEQ ID NO: 233), showing homology to clone 102D24 on chromosome 11q13.31, was found to be over-expressed in breast tumors and in SCID tumors. Clone 19517.1 (SEQ ID NO: 237), showing homology to human PAC 128M19 clone, was found to be slightly over-expressed in the majority of breast tumors tested. Clone 19392.2 (SEQ ID NO: 247), showing homology to human chromosome 17, was shown to be over-expressed in 50% of breast tumors tested. Clone 19399.2 (SEQ ID NO: 250), showing homology to human Xp22 BAC GSHB-184P14, was shown to be slightly over-expressed in a limited number of breast tumors tested.

In subsequent studies, 64 individual clones were isolated from a subtracted cDNA library containing cDNA from a pool of breast tumors subtracted with cDNA from five normal tissues (brain, liver, PBMC, pancreas and normal breast). The subtracted cDNA library was prepared as described above with the following modification. A combination of five six-base cutters (MluI, MscI, PvuII, SalI and StuI) was used to digest the cDNA instead of RsaI. This resulted in an increase in the average insert size from 300 bp to 600 bp. The 64 isolated clones were colony PCR amplified and their mRNA expression levels in breast tumor tissue, normal breast and various other normal tissues were examined by microarray technology as described above. The determined cDNA sequences of 11 clones which were found to be over-expressed in breast tumor tissue are provided in SEQ ID NO: 405-415. Comparison of these sequences to those in the public database, as outlined above, revealed homologies between the sequences of SEQ ID NO: 408, 411, 413 and 414 and previously isolated ESTs. The sequences of SEQ ID NO: 405-407, 409, 410, 412 and 415 were found to show some homology to previously identified sequences.

In further studies, a subtracted cDNA library was prepared from cDNA from metastatic breast tumors subtracted with a pool of cDNA from five normal tissues (breast, brain, lung, pancreas and PBMC) using the PCR-subtraction protocol of Clontech, described above. The determined cDNA sequences of 90 clones isolated from this library are provided in SEQ ID NO: 315-404. Comparison of these sequences with those in the public database, as described above, revealed no significant homologies to the sequence of SEQ ID NO: 366. The sequences of SEQ ID NO: 320-324, 342, 353, 367, 368, 377, 382, 385, 389, 395, 397 and 400 were found to show some homology to previously isolated ESTs. The remaining sequences were found to show homology to previously identified gene sequences.

In yet further studies, a subtracted cDNA library (referred to as 2BT) was prepared from cDNA from breast tumors subtracted with a pool of cDNA from six normal tissues (liver, brain, stomach, small intestine, kidney and heart) using the PCR-subtraction protocol of Clontech, described above. cDNA clones isolated from this subtraction were subjected to DNA microarray analysis as described above and the resulting data subjected to four modified Gemtools analyses. The first analysis compared 28 breast tumors with 28 non-breast normal tissues. A mean over-expression of at least 2.1 fold was used as a selection cut-off. The second analysis compared 6 metastatic breast tumors with 29 non-breast normal tissues. A mean over-expression of at least 2.5 fold was used as a cut-off. The third and fourth analyses compared 2 early SCID mouse-passaged with 2 late SCID mouse-passaged tumors. A mean over-expression in the early or late passaged tumors of 2.0 fold or greater was used as a cut-off. In addition, a visual analysis was performed on the microarray data for the 2BT clones. The determined cDNA sequences of 13 clones identified in the visual analysis are provided in SEQ ID NO: 427-439. The determined cDNA sequences of 22 clones identified using the modified Gemtools analysis are provided in SEQ ID NO: 440-462, wherein SEQ ID NO: 453 and 454 represent two partial, non-overlapping, sequences of the same clone.

Comparison of the clone sequences of SEQ ID NO: 436 and 437 (referred to as 263G6 and 262B2) with those in the public databases, as described above, revealed no significant homologies to previously identified sequences. The sequences of SEQ ID NO: 427, 429, 431, 435, 438, 441, 443, 444, 445, 446, 450, 453 and 454 (referred to as

266B4, 266G3, 264B4, 263G1, 262B6, 2BT2-34, 2BT1-77, 2BT1-62, 2BT1-60,61, 2BT1-59, 2BT1-52 and 2BT1-40, respectively) showed some homology to previously isolated expressed sequences tags (ESTs). The sequences of SEQ ID NO: 428, 430, 432, 433, 434, 439, 440, 442, 447, 448, 449, 451, 452 and 455-462 (referred to as clones 22892, 22890, 22883, 22882, 22880, 22869, 21374, 21349, 21093, 21091, 21089, 21085, 21084, 21063, 21062, 21060, 21053, 21050, 21036, 21037 and 21048, respectively), showed some homology to gene sequences previously identified in humans.

Example 2

ISOLATION AND CHARACTERIZATION OF BREAST
TUMOR POLYPEPTIDES OBTAINED BY PCR-BASED SUBTRACTION USING
SCID-PASSAGED TUMOR RNA

Human breast tumor antigens were obtained by PCR-based subtraction using SCID mouse passaged breast tumor RNA as follows. Human breast tumor was implanted in SCID mice and harvested on the first or sixth serial passage, as described in Patent Application Serial No. 08/556,659 filed 11/13/95, U.S. Patent No._____. Genes found to be differentially expressed between early and late passage SCID tumor may be stage specific and therefore useful in therapeutic and diagnostic applications. Total RNA was prepared from snap frozen SCID passaged human breast tumor from both the first and sixth passage.

PCR-based subtraction was performed essentially as described above. In the first subtraction (referred to as T9), RNA from first passage tumor was subtracted from sixth passage tumor RNA to identify more aggressive, later passage-specific antigens. Of the 64 clones isolated and sequenced from this subtraction, no significant homologies were found to 30 of these clones, hereinafter referred to as: 13053, 13057, 13059, 13065, 13067, 13068, 13071-13073, 13075, 13078, 13079, 13081, 13082, 13092, 13097, 13101, 13102, 13131, 13133, 13119, 13135, 13139, 13140, 13146-13149, and 13151, with the exception of some previously identified expressed sequence tags (ESTs). The determined cDNA sequences for these clones are provided in SEQ ID NO: 88-116,

respectively. The isolated cDNA sequences of SEQ ID NO: 117-140 showed homology to known genes.

In a second PCR-based subtraction, RNA from sixth passage tumor was subtracted from first passage tumor RNA to identify antigens down-regulated over multiple passages. Of the 36 clones isolated and sequenced, no significant homologies were found to nineteen of these clones, hereinafter referred to as: 14376, 14377, 14383, 14384, 14387, 14392, 14394, 14398, 14401, 14402, 14405, 14409, 14412, 14414-14416, 14419, 14426, and 14427, with the exception of some previously identified expressed sequence tags (ESTs). The determined cDNA sequences for these clones are provided in SEQ ID NO: 141-159, respectively. The isolated cDNA sequences of SEQ ID NO: 160-174 were found to show homology to previously known genes.

Further analysis of human breast tumor antigens through PCR-based subtraction using first and sixth passage SCID tumor RNA was performed. Sixty three clones were found to be differentially expressed by a two or more fold margin, as determined by microarray analysis, i.e., higher expression in early passage tumor over late passage tumor, or vice versa.. Seventeen of these clones showed no significant homology to any known genes, although some degree of homology with previously identified expressed sequence tags (ESTs) was found, hereinafter referred to as 20266, 20270, 20274, 20276, 20277, 20280, 20281, 20294, 20303, 20310, 20336, 20341, 20941, 20954, 20961, 20965 and 20975 (SEQ ID NO: 252-268, respectively). The remaining clones were found to share some degree of homology to known genes, which are identified in the Brief Description of the Drawings and Sequence Identifiers section above, hereinafter referred to as 20261, 20262, 20265, 20267, 20268, 20271, 20272, 20273, 20278, 20279, 20293, 20300, 20305, 20306, 20307, 20313, 20317, 20318, 20320, 20321, 20322, 20326, 20333, 20335, 20337, 20338, 20340, 20938, 20939, 20940, 20942, 20943, 20944, 20946, 20947, 20948, 20949, 20950, 20951, 20952, 20957, 20959, 20966, 20976, 20977 and 20978. The determined cDNA sequences for these clones are provided in SEQ ID NO: 269-313, respectively.

The clones 20310, 20281, 20262, 20280, 20303, 20336, 20270, 20341, 20326 and 20977 (also referred to as B820P, B821P, B822P, B823P, B824P, B825P, B826P, B827P, B828P and B829P, respectively) were selected for further analysis based

on the results obtained with microarray analysis. Specifically, microarray data analysis indicated at least two- to three-fold overexpression of these clones in breast tumor RNA compared to normal tissues tested. Subsequent studies led to the determination of the complete insert sequence for the clones B820P, B821P, B822P, B823P, B824P, B825P, B826P, B827P, B828P and B829P. These extended cDNA sequences are provided in SEQ ID NO: 416-426, respectively.

Example 3
SYNTHESIS OF POLYPEPTIDES

Polypeptides may be synthesized on an Perkin Elmer/Applied Biosystems Division 430A peptide synthesizer using FMOC chemistry with HPTU (O-Benzotriazole-N,N,N',N'-tetramethyluronium hexafluorophosphate) activation. A Gly-Cys-Gly sequence may be attached to the amino terminus of the peptide to provide a method of conjugation, binding to an immobilized surface, or labeling of the peptide. Cleavage of the peptides from the solid support may be carried out using the following cleavage mixture: trifluoroacetic acid:ethanedithiol:thioanisole:water:phenol (40:1:2:2:3). After cleaving for 2 hours, the peptides may be precipitated in cold methyl-t-butyl-ether. The peptide pellets may then be dissolved in water containing 0.1% trifluoroacetic acid (TFA) and lyophilized prior to purification by C18 reverse phase HPLC. A gradient of 0%-60% acetonitrile (containing 0.1% TFA) in water (containing 0.1% TFA) may be used to elute the peptides. Following lyophilization of the pure fractions, the peptides may be characterized using electrospray or other types of mass spectrometry and by amino acid analysis.

From the foregoing, it will be appreciated that, although specific embodiments of the invention have been described herein for the purposes of illustration, various modifications may be made without deviating from the spirit and scope of the invention.

Claims

1.   An isolated polypeptide comprising at least an immunogenic portion of a breast tumor protein, or a variant thereof, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(a)   sequences recited in SEQ ID NOS: 2, 4-15, 18-33, 35-47, 49-56, 58, 59, 63-73, 88-116, 141-159, 175, 178, 180, 185, 186, 194, 199, 205, 208, 211, 214-216, 219, 222, 226, 232, 236, 240, 241, 245, 246, 252-268, 320-324, 342, 353, 366-368, 377, 382, 385, 389, 395, 397, 400, 408, 411, 413, 414, 416, 417, 419-423, 426, 427, 429, 431, 435-438, 441, 443-446, 450, 453, 454 and 463-468;

(b)   sequences that hybridize to a sequence of SEQ ID NOS: 2, 4-15, 18-33, 35-47, 49-56, 58, 59, 63-73, 88-116, 141-159, 175, 178, 180, 185, 186, 194, 199, 205, 208, 211, 214-216, 219, 222, 226, 232, 236, 240, 241, 245, 246, 252-268, 320-324, 342, 353, 366-368, 377, 382, 385, 389, 395, 397, 400, 408, 411, 413, 414, 416, 417, 419-423, 426, 427, 429, 431, 435-438, 441, 443-446, 450, 453, 454 and 463-468 under moderately stringent conditions; and

(c)   a complement of a sequence of (a) or (b).

2.   An isolated polypeptide according to claim 1, wherein the polypeptide comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOS: 2, 4-15, 18-33, 35-47, 49-56, 58, 59, 63-73, 88-116, 141-159, 175, 178, 180, 185, 186, 194, 199, 205, 208, 211, 214-216, 219, 222, 226, 232, 236, 240, 241, 245, 246, 252-268, 320-324, 342, 353, 366-368, 377, 382, 385, 389, 395, 397, 400, 408, 411, 413, 414, 416, 417, 419-423, 426, 427, 429, 431, 435-438, 441, 443-446, 450, 453, 454 and 463-468 or a complement of any of the foregoing polynucleotide sequences.

3.   An isolated polypeptide comprising a sequence recited in any one of SEQ ID NO: 176, 179, 181 and 469-473.

4.   An isolated polynucleotide encoding at least 15 contiguous amino acid residues of a breast tumor protein, or a variant thereof that differs in one or more substitutions, deletions, additions and/or insertions such that the ability of the variant to react with antigen-specific antisera is not substantially diminished, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide comprising a sequence recited in any one of SEQ ID NOS: 2, 4-15, 18-33, 35-47, 49-56, 58, 59, 63-73, 88-116, 141-159, 175, 178, 180, 185, 186, 194, 199, 205, 208, 211, 214-216, 219, 222, 226, 232, 236, 240, 241, 245, 246, 252-268, 320-324, 342, 353, 366-368, 377, 382, 385, 389, 395, 397, 400, 408, 411, 413, 414, 416, 417, 419-423, 426, 427, 429, 431, 435-438, 441, 443-446, 450, 453, 454 and 463-468 or a complement of any of the foregoing sequences.

5.   An isolated polynucleotide encoding a breast tumor protein, or a variant thereof, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide comprising a sequence recited in any one of SEQ ID NOS: 2, 4-15, 18-33, 35-47, 49-56, 58, 59, 63-73, 88-116, 141-159, 175, 178, 180, 185, 186, 194, 199, 205, 208, 211, 214-216, 219, 222, 226, 232, 236, 240, 241, 245, 246, 252-268, 320-324, 342, 353, 366-368, 377, 382, 385, 389, 395, 397, 400, 408, 411, 413, 414, 416, 417, 419-423, 426, 427, 429, 431, 435-438, 441, 443-446, 450, 453, 454 and 463-468 or a complement of any of the foregoing sequences.

6.   An isolated polynucleotide comprising a sequence recited in any one of SEQ ID NOS: 2, 4-15, 18-33, 35-47, 49-56, 58, 59, 63-73, 88-116, 141-159, 175, 178, 180, 185, 186, 194, 199, 205, 208, 211, 214-216, 219, 222, 226, 232, 236, 240, 241, 245, 246, 252-268, 320-324, 342, 353, 366-368, 377, 382, 385, 389, 395, 397, 400, 408, 411, 413, 414, 416, 417, 419-423, 426, 427, 429, 431, 435-438, 441, 443-446, 450, 453, 454 and 463-468.

7.   An isolated polynucleotide comprising a sequence that hybridizes to a sequence recited in any one of SEQ ID NOS: 2, 4-15, 18-33, 35-47, 49-56, 58, 59, 63-73, 88-116, 141-159, 175, 178, 180, 185, 186, 194, 199, 205, 208, 211, 214-216, 219,

222, 226, 232, 236, 240, 241, 245, 246, 252-268, 320-324, 342, 353, 366-368, 377, 382, 385, 389, 395, 397, 400, 408, 411, 413, 414, 416, 417, 419-423, 426, 427, 429, 431, 435-438, 441, 443-446, 450, 453, 454 and 463-468 under moderately stringent conditions.

8.   An isolated polynucleotide complementary to a polynucleotide according to any one of claims 4-7.

9.   An expression vector comprising a polynucleotide according to any one of claims claim 4-7.

10.   A host cell transformed or transfected with an expression vector according to claim 9.

11.   An expression vector comprising a polynucleotide according claim 8.

12.   A host cell transformed or transfected with an expression vector according to claim 11.

13.   A pharmaceutical composition comprising a polypeptide according to claim 1, in combination with a physiologically acceptable carrier.

14.   A vaccine comprising a polypeptide according to claim 1, in combination with an immunostimulant.

15.   A vaccine according to claim 14, wherein the immunostimulant is an adjuvant.

16.   A vaccine according to claim 14, wherein the immunostimulant induces a predominantly Type I response.

17.   A pharmaceutical composition comprising a polynucleotide according to claim 4, in combination with a physiologically acceptable carrier.

18.   A vaccine comprising a polynucleotide according to claim 4, in combination with an immunostimulant.

19.   A vaccine according to claim 18, wherein the immunostimulant is an adjuvant.

20.   A vaccine according to claim 18, wherein the immunostimulant induces a predominantly Type I response.

21.   An isolated antibody, or antigen-binding fragment thereof, that specifically binds to a breast tumor protein that comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOS: 2, 4-15, 18-33, 35-47, 49-56, 58, 59, 63-73, 88-116, 141-159, 175, 178, 180, 185, 186, 194, 199, 205, 208, 211, 214-216, 219, 222, 226, 232, 236, 240, 241, 245, 246, 252-268, 320-324, 342, 353, 366-368, 377, 382, 385, 389, 395, 397, 400, 408, 411, 413, 414, 416, 417, 419-423, 426, 427, 429, 431, 435-438, 441, 443-446, 450, 453, 454 and 463-468 or a complement of any of the foregoing polynucleotide sequences.

22.   A pharmaceutical composition comprising an antibody or fragment thereof according to claim 18, in combination with a physiologically acceptable carrier.

23. A pharmaceutical composition comprising an antigen-presenting cell that expresses a polypeptide according to claim 1, in combination with a pharmaceutically acceptable carrier or excipient.

24. A pharmaceutical composition according to claim 23, wherein the antigen presenting cell is a dendritic cell or a macrophage.

25. A vaccine comprising an antigen-presenting cell that expresses a polypeptide according to claim 1, in combination with an immunostimulant.

26. A vaccine according to claim 25, wherein the immunostimulant is an adjuvant.

27. A vaccine according to claim 25, wherein the immunostimulant induces a predominantly Type I response.

28. A vaccine according to claim 25, wherein the antigen-presenting cell is a dendritic cell.

29. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a polypeptide according to claim 1, and thereby inhibiting the development of a cancer in the patient.

30. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a polynucleotide according to claim 4, and thereby inhibiting the development of a cancer in the patient.

31. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of an antibody or antigen-binding fragment thereof according to claim 21, and thereby inhibiting the development

of a cancer in the patient.

32. A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of an antigen-presenting cell that expresses a polypeptide according to claim 1, and thereby inhibiting the development of a cancer in the patient.

33. A method according to claim 32, wherein the antigen-presenting cell is a dendritic cell.

34. A method according to any one of claims 29-32, wherein the cancer is breast cancer .

35. A fusion protein comprising at least one polypeptide according to claim 1.

36. A fusion protein according to claim 35, wherein the fusion protein comprises an expression enhancer that increases expression of the fusion protein in a host cell transfected with a polynucleotide encoding the fusion protein.

37. A fusion protein according to claim 35, wherein the fusion protein comprises a T helper epitope that is not present within the polypeptide of claim 1.

38. A fusion protein according to claim 35, wherein the fusion protein comprises an affinity tag.

39. An isolated polynucleotide encoding a fusion protein according to claim 35.

40.   A pharmaceutical composition comprising a fusion protein according to claim 32, in combination with a physiologically acceptable carrier.

41.   A vaccine comprising a fusion protein according to claim 35, in combination with an immunostimulant.

42.   A vaccine according to claim 41, wherein the immunostimulant is an adjuvant.

43.   A vaccine according to claim 41, wherein the immunostimulant induces a predominantly Type I response.

44.   A pharmaceutical composition comprising a polynucleotide according to claim 40, in combination with a physiologically acceptable carrier.

45.   A vaccine comprising a polynucleotide according to claim 40, in combination with an immunostimulant.

46.   A vaccine according to claim 45, wherein the immunostimulant is an adjuvant.

47.   A vaccine according to claim 45, wherein the immunostimulant induces a predominantly Type I response.

48.   A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a pharmaceutical composition according to claim 40 or claim 44.

49.   A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a vaccine according to claim 41 or claim 45.

50.   A method for removing tumor cells from a biological sample, comprising contacting a biological sample with T cells that specifically react with a breast tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

(i)   polynucleotides recited in any one of SEQ ID NOS: 1-175, 178, 180 and 182-468; and

(ii)   complements of the foregoing polynucleotides;

wherein the step of contacting is performed under conditions and for a time sufficient to permit the removal of cells expressing the antigen from the sample.

51.   A method according to claim 50, wherein the biological sample is blood or a fraction thereof.

52.   A method for inhibiting the development of a cancer in a patient, comprising administering to a patient a biological sample treated according to the method of claim 50.

53.   A method for stimulating and/or expanding T cells specific for a breast tumor protein, comprising contacting T cells with one or more of:

(i)   a polypeptide according to claim 1;

(ii)   a polynucleotide encoding such a polypeptide; and/or

(iii)   an antigen presenting cell that expresses such a polypeptide;

under conditions and for a time sufficient to permit the stimulation and/or expansion of T cells.

54.   An isolated T cell population, comprising T cells prepared according to the method of claim 53.

55.   A method for inhibiting the development of a cancer in a patient, comprising administering to a patient an effective amount of a T cell population according to claim 54.

56.   A method for inhibiting the development of a cancer in a patient, comprising the steps of:

(a)   incubating $CD4^+$ and/or CD8+ T cells isolated from a patient with at least one component selected from the group consisting of:

(i)   a polypeptide according to claim 1;

(ii)   a polynucleotide encoding such a polypeptide; or

(iii)   an antigen-presenting cell that expresses such a polypeptide;

such that T cells proliferate; and

(b)   administering to the patient an effective amount of the proliferated T cells, and thereby inhibiting the development of a cancer in the patient.

57.   A method for inhibiting the development of a cancer in a patient, comprising the steps of:

(a)   incubating $CD4^+$ and/or CD8+ T cells isolated from a patient with at least one component selected from the group consisting of:

(i)   a polypeptide according to claim 1;

(ii)   a polynucleotide encoding such a polypeptide; or

(iii)   an antigen-presenting cell that expresses such a polypeptide;

such that T cells proliferate;

(b)   cloning at least one proliferated cell; and

(c)   administering to the patient an effective amount of the cloned T cells, and thereby inhibiting the development of a cancer in the patient.

58.   A method for determining the presence or absence of a cancer in a patient, comprising the steps of:

    (a)   contacting a biological sample obtained from a patient with a binding agent that binds to a breast tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence selected from the group consisting of:

    (i)   polynucleotides recited in any one of SEQ ID NOS: 1-175, 178, 180 and 182-468; and

    (ii)   complements of the foregoing polynucleotides;

    (b)   detecting in the sample an amount of polypeptide that binds to the binding agent; and

    (c)   comparing the amount of polypeptide to a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient.

59.   A method according to claim 58, wherein the binding agent is an antibody.

60.   A method according to claim 59, wherein the antibody is a monoclonal antibody.

61.   A method according to claim 58, wherein the cancer is breast cancer.

62.   A method for monitoring the progression of a cancer in a patient, comprising the steps of:

    (a)   contacting a biological sample obtained from a patient at a first point in time with a binding agent that binds to a breast tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOS: 1-175, 178, 180 and 182-468 or a complement of any of the foregoing polynucleotides;

    (b)   detecting in the sample an amount of polypeptide that binds to the binding agent;

    (c)   repeating steps (a) and (b) using a biological sample obtained from

the patient at a subsequent point in time; and

    (d)   comparing the amount of polypeptide detected in step (c) to the amount detected in step (b) and therefrom monitoring the progression of the cancer in the patient.

63.   A method according to claim 62, wherein the binding agent is an antibody.

64.   A method according to claim 63, wherein the antibody is a monoclonal antibody.

65.   A method according to claim 62, wherein the cancer is a breast cancer.

66.   A method for determining the presence or absence of a cancer in a patient, comprising the steps of:

    (a)   contacting a biological sample obtained from a patient with an oligonucleotide that hybridizes to a polynucleotide that encodes a breast tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOS: 1-175, 178, 180 and 182-468 or a complement of any of the foregoing polynucleotides;

    (b)   detecting in the sample an amount of a polynucleotide that hybridizes to the oligonucleotide; and

    (c)   comparing the amount of polynucleotide that hybridizes to the oligonucleotide to a predetermined cut-off value, and therefrom determining the presence or absence of a cancer in the patient.

67.   A method according to claim 66, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a polymerase chain reaction.

68. A method according to claim 66, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a hybridization assay.

69. A method for monitoring the progression of a cancer in a patient, comprising the steps of:

(a) contacting a biological sample obtained from a patient with an oligonucleotide that hybridizes to a polynucleotide that encodes a breast tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOS: 1-175, 178, 180 and 182-468 or a complement of any of the foregoing polynucleotides;

(b) detecting in the sample an amount of a polynucleotide that hybridizes to the oligonucleotide;

(c) repeating steps (a) and (b) using a biological sample obtained from the patient at a subsequent point in time; and

(d) comparing the amount of polynucleotide detected in step (c) to the amount detected in step (b) and therefrom monitoring the progression of the cancer in the patient.

70. A method according to claim 69, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a polymerase chain reaction.

71. A method according to claim 69, wherein the amount of polynucleotide that hybridizes to the oligonucleotide is determined using a hybridization assay.

72. A diagnostic kit, comprising:

(a) one or more antibodies according to claim 21; and

(b) a detection reagent comprising a reporter group.

73. A kit according to claim 72, wherein the antibodies are immobilized on a solid support.

74. A kit according to claim 73, wherein the solid support comprises nitrocellulose, latex or a plastic material.

75. A kit according to claim 72, wherein the detection reagent comprises an anti-immunoglobulin, protein G, protein A or lectin.

76. A kit according to claim 72, wherein the reporter group is selected from the group consisting of radioisotopes, fluorescent groups, luminescent groups, enzymes, biotin and dye particles.

77. An oligonucleotide comprising 10 to 40 contiguous nucleotides that hybridize under moderately stringent conditions to a polynucleotide that encodes a breast tumor protein, wherein the tumor protein comprises an amino acid sequence that is encoded by a polynucleotide sequence recited in any one of SEQ ID NOS: 2, 4-15, 18-33, 35-47, 49-56, 58, 59, 63-73, 88-116, 141-159, 175, 178, 180, 185, 186, 194, 199, 205, 208, 211, 214-216, 219, 222, 226, 232, 236, 240, 241, 245, 246, 252-268, 320-324, 342, 353, 366-368, 377, 382, 385, 389, 395, 397, 400, 408, 411, 413, 414, 416, 417, 419-423, 426, 427, 429, 431, 435-438, 441, 443-446, 450, 453, 454 and 463-468 or a complement of any of the foregoing polynucleotides.

78.   A oligonucleotide according to claim 77, wherein the oligonucleotide comprises 10-40 contiguous nucleotides recited in any one of SEQ ID NOS: 2, 4-15, 18-33, 35-47, 49-56, 58, 59, 63-73, 88-116, 141-159, 175, 178, 180, 185, 186, 194, 199, 205, 208, 211, 214-216, 219, 222, 226, 232, 236, 240, 241, 245, 246, 252-268, 320-324, 342, 353, 366-368, 377, 382, 385, 389, 395, 397, 400, 408, 411, 413, 414, 416, 417, 419-423, 426, 427, 429, 431, 435-438, 441, 443-446, 450, 453, 454 and 463-468.

79.   A diagnostic kit, comprising:

(a)   an oligonucleotide according to claim 77; and

(b)   a diagnostic reagent for use in a polymerase chain reaction or hybridization assay.

1

SEQUENCE LISTING

<110> Corixa Corporation
      Yuqui, Jiang
      Dillon, Davin C.
      Mitcham, Jennifer L.
      Xu, Jiangchun
      Harlocker, Susan L.

<120> COMPOSITIONS FOR THE TREATMENT AND
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        <400> 31
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aaaggctatc aagtactttg aaggacagga aggaatgaac acacccaggt ggacgtttgg     60
tttcatttgc aggggttcag ggagggttgc aggggttcag ggagggctct tgtcccacaa    120
ccggggggaag ggagagggca c                                              141
```

        <210> 32
        <211> 201
        <212> DNA
        <213> Homo sapien

        <400> 32
```
gagctgatct cacagcacat acagaatgat gctactatgt agaccctcac tcccttggga     60
aatctgtcat ctaccttaaa gagagaaaaa agatggaaca taggcccacc tagtttcatc    120
catccaccta cataaccaac atagatgtga ggtccactgc actgatagcc agactgcctg    180
gggtaaacct tttcagggag g                                               201
```

        <210> 33
        <211> 181
        <212> DNA
        <213> Homo sapien

        <400> 33
```
tttcaaaaca ctcatatgtt gcaaaaaaca catagaaaaa taaagtttgg tggggggtgct     60
gactaaactt caagtcacag actttttatgt gacagattgg agcagggttt gttatgcatg    120
tagagaaccc aaactaattt attaaacagg atagaaacag gctgtctggg tgaaatggtt    180
c                                                                    181
```

        <210> 34
        <211> 151
        <212> DNA
        <213> Homo sapien

9

```
        <400> 34
atgtcctgca cagtatagct tggacctctg ggcctgaacc agggtgagca tcaaggcccc        60
catttctcct caccacgggg tcgcttgtca gctccaagaa ccagtctggc cccactgaga       120
actttcagt cgagggcctg atgaatcttg g                                       151


        <210> 35
        <211> 291
        <212> DNA
        <213> Homo sapien


        <400> 35
tctttagggc aaaatcatgt ttctgtgtac ctagcaatgt gttcccattt tattaagaaa        60
agctttaaca cgtgtaatct gcagtcctta acagtggcgt aattgtacgt acctgttgtg       120
tttcagtttg tttttcacct ataatgaatt gtaaaaacaa acatacttgt ggggtctgat       180
agcaaacata gaaatgatgt atattgtttt ttgttatcta tttattttca tcaatacagt       240
attttgatgt attgcaaaaa tagataataa tttatataac aggttttctg t               291


        <210> 36
        <211> 201
        <212> DNA
        <213> Homo sapien


        <400> 36
ctgatacaat tataataacg gttccctgaa ccttttagag tgcaattaag aacaaaaact        60
aaattttgtt tacatgaata tggaataaat acaataatca aaatatgact ctccctaaaa       120
gtgaaacaca caagccaatc cggaactgct gtgcgaaaga taaaatcgag aaaggcaagg       180
tttcggtagg aggacgcgat g                                                 201


        <210> 37
        <211> 121
        <212> DNA
        <213> Homo sapien


        <400> 37
catcacactg gcggccgctc gagcatgcat ctagagggcc caattcgccc tataatgagt        60
cgtattacaa ttcactggcc gtcgttttac aacgtcgtga ctgggaaaac cctggcgtta       120
c                                                                       121


        <210> 38
        <211> 200
        <212> DNA
        <213> Homo sapien


        <400> 38
aaacatgtat tactctatat ccccaagtcc tagagcatga cctgcatgtt ggagatgttg        60
tacagcaatg tatttatcca gacatacata tatgatattt agagacacag tgattctttt       120
gataacacca cacatagaac attataatta cacacaaatt tatggtaaaa gaattaatat       180
gctgtctggt gctgctgtta                                                   200


        <210> 39
        <211> 760
        <212> DNA
        <213> Homo sapien
```

10

```
        <400> 39
gcgtggtcgt cggccgaggt cctgggctag acctaatggt ttattattgg tggagagaaa          60
gatctggaaa tacttgaggt tattacatac tagattagct tctaatgtga accatttttc         120
ttttaacagt gatcaaatta ttatttcgaa gttaatcgtt cccttggtgg ctgcatacac         180
atcgcattaa caaacatact gttgtatttt ttcccagttt tgtttggcta tgccaccaca         240
gtcatcccca gggtctatac atactatgtt tcaactgtat tatttgccat ttttggcatt         300
agaatgcttc gggaaggctt aaagatgagc cctgatgagg tcaagagga actggaagaa          360
gttcaagctg aattaaagaa gaaagatgaa gaagtaagcc atggcactgt tgatctggac         420
caaaaaggca ctcaactagg aataaacact ctacagaggt ttctcagtgg ccccatctgt         480
gtgatatgcg gggctacaca aaaatagctt cttttgcttt gttctgttct tatacctgtc         540
tgtgatctga cttgggggttg gtgtgaatgt agtagagaaa ggaagctgac agatgaatac         600
tgaacacagg taatcagttt ccttaattag gttgattata agctcctgaa aagcaggaac         660
tgtattttat aatttttacct gtttctcccg tggtgtctag gatagtaagt gagcagagca         720
gtaaatactg tttggtttgt tcagacctgc ccgggcggcc                               760


        <210> 40
        <211> 452
        <212> DNA
        <213> Homo sapien

        <400> 40
aatcactaaa gatattgact agagaatgct gtgtgctatt tcaattacat ttgttttttct         60
tttattaaca ggaattttga ttcttcaagg aagtggctca atttcaattt caggtgacca         120
ggtttatcgt gacttttcct tcttgtttac ttttcgctag gaaggggagt tgtaggggca         180
gattcaggta ttggaatagg aaaattacgt ctaaaccatg gaaatcttgg aaatggaatt         240
ggtggaagtg ggcgaaatgg atatgggtaa gggaacacaa aaaaccctga agctaattca         300
tcgctgtcac tgatacttct ttttttctcgt tcctggtctt gagagactgg gaaaccaaca         360
gccactgcca agatggctgt gatcaggagg agaactttct tcatctcaaa cgtttcagtc         420
agttctttct ctcacctcgg ccgcgaccac gc                                       452


        <210> 41
        <211> 676
        <212> DNA
        <213> Homo sapien

        <400> 41
aatctttgaa tgccaagtct cttctgtact ttctttattt aacatcatag tctttgcatc         60
aagatacata gcaatgatag caggtttctt tttaaagctt agtattaata ttaaatatt         120
ttccccattt aaattttaca ttacttgcca agaaaaaaaa aaaattaaaa ctcaagttac         180
ttgaagcctg gacacacttc catgattagc cgggctaggt aaaagttggt ggctttattc         240
ttcctgctct ataagcagat ccaggcccta gaaagatggg accagggtat ataattgttt         300
ttgaaaagtg tgctacaaaa atggatggcc tgttataagc caggatacaa agttaaggat         360
gggggtaagg gaggacatt ttcttccaga agaaaagaca gaatttctga agagtcccag          420
tccataattt tcccaaaatg gttggaggag agggtaaaat ctcaacatga gtttcaaagt         480
actgtctctg tgaggggccg gtagatgcct tgctgaggag ggatggctaa tttggaccat         540
gccccatccc cagctaggag aatggaaatg gaaacttaa ttgcccagtg ggtgtgaaag          600
tgggctgaag cttggttggt actgaattct ctaagaggtt tcttctagaa acagacaact         660
cagacctgcc cgggcg                                                         676


        <210> 42
        <211> 468
        <212> DNA
        <213> Homo sapien

        <400> 42
```

11

```
agcgtggtcg cggccgaggt ttggccggga gcctgatcac ctgccctgct gagtcccagg      60
ctgagcctca gtctccctcc cttggggcct atgcagaggt ccacaacaca cagatttgag     120
ctcagccctg gtgggcagag aggtagggat ggggctgtgg ggatagtgag gcatcgcaat     180
gtaagactcg ggattagtac acacttgttg attaatggaa atgtttacag atccccaagc     240
ctggcaaggg aatttcttca actccctgcc ccccagccct ccttatcaaa ggacaccatt     300
ttggcaagct ctatgaccaa ggagccaaac atcctacaag acacagtgac catactaatt     360
aaaacccct gcaaagccca gcttgaaacc ttcacttagg aacgtaatcg tgtcccctat       420
cctacttccc cttcctaatt ccacagacct gcccgggcgg ccgctcga                   468
```

        <210> 43
        <211> 408
        <212> DNA
        <213> Homo sapien

        <400> 43
```
atcatatcaa aacactatct tcccatctgt ttctcaatgc ctgctacttc ttgtagatat      60
ttcatttcag gagagcagca gttaaacccg tggattttgt agttaggaac ctgggttcaa     120
acctctttcc actaattggc tatgtctctg gacagttttt tttttttttt tttttttttaa    180
acccttTctg aactttcact ttctatggct acctcaaaga attgttgtga ggcttgagat     240
aatgcatttg taaagggtct gccagatagg aagatgctag ttatggattt acaaggttgt     300
taaggctgta agagtctaaa acctacagtg aatcacaatg catttacccc cactgacttg     360
gacataagtg aaaactagcc cgaagtctct ttttcaaatt acttacag                   408
```

        <210> 44
        <211> 160
        <212> DNA
        <213> Homo sapien

        <400> 44
```
tggtcgcggc cgaggtcttg tgtgccctgt ggtccagggg accaagaaca acaagatcca      60
ctctctgtgc tacaatgatt gcaccttctc acgcaacact ccaaccagga ctttcaacta     120
caacttctcc gctttggcaa acaccgtcac tcttgctgga                           160
```

        <210> 45
        <211> 231
        <212> DNA
        <213> Homo sapien

        <400> 45
```
cgagcggccg cccgggcagg tctggggagg tgattccatc cagagtcata tctgttgtca      60
ccccaataag tcgatcagca aggctgacag gctgtgagga aaccccggcc ttgtagcctg     120
tcacctctgg ggggatgatg actgcctggc agacgtaggc tgtgatagat ttggggagaaa    180
acctgactca ccctcaggaa tccggaggtc ggtgacattg tcggtgcaca c              231
```

        <210> 46
        <211> 371
        <212> DNA
        <213> Homo sapien

        <400> 46
```
cccgggcagg tctgtgtaac atgccaaggc tttgcacttt ctgcagagca gttttttatt      60
ttccttatca ggtacaggtt ttggttttttc ttgactatct ctgatgaatt tttcatgagt    120
ctgtatatgc agaatctttt ccctaaatac tgcttcgtcc catgtctgaa ggcgtaaaat     180
aaagtcattc atcatttttt ctttgtacat gtttatttgt tctttttcaa ttacaccaag     240
cattactagt cagaaggaag cacttgctac ctcttgctct tcctctgcct ctggtttgga     300
```

12

```
tcattttgat gacattgccc acattactca tgaaggatga caagattgca ctgtgcaatg        360
tcaattgcct t                                                              371
```

        <210> 47
        <211> 261
        <212> DNA
        <213> Homo sapien

        <400> 47
```
gccctgtttt tatacacttc acatttgcag aaatataatg atgccctcat tatcagtgag         60
catgcacgaa tgaaagatgc tctggattac ttgaaagact tcttcagcaa tgtccgagca        120
gcaggattcg atgagattga gcaagatctt actcagagat ttgaagaaaa gctgcaggaa        180
ctagaaagtg tttccaggga tcccagcaat gagaatccta aacttgaaga cctctgcttc        240
atcttacaag aagagtacca c                                                  261
```

        <210> 48
        <211> 701
        <212> DNA
        <213> Homo sapien

        <400> 48
```
cgagcggccc ccgggcaggt ccaattagta caagtctcat gatataatca ctgcctgcat         60
acatatgcac agatccagtt agtgagtttg tcaagcttaa tctaattggt taagtctcaa        120
agagattatt attcttgatg tttgctttgt attggctaac aaatgtgcag aggtaataca        180
tatgtgatgt ccgatgtctc tgtctttttt tttgtcttta aaaaataatt ggcagcaact        240
gtatttgaat aaaatgattt cttagtatga ttgtaccgta atgaatgaaa gtggaacatg        300
tttctttttg aaagggagag aattgaccat ttattattgt gatgtttaag ttataactta        360
ttgagcactt ttagtagtga taactgtttt taaacttgcc taataccttt cttgggtatt        420
gtttgtaatg tgacttattt aacccccttt tttgtttgtt taagttgctg ctttaggtta        480
acagcgtgtt ttagaagatt taaatttttt tcctgtctgc acaattagtt attcagagca        540
agagggcctg attttataga agcccttga aaagaggtcc agatgagagc agagatacag         600
tgagaaatta tgtgatctgt gtgttgtggg aagagaattt caatatgta actacggagc         660
tgtagtgcca ttagaaactg tgaatttcca aataaatttg a                            701
```

        <210> 49
        <211> 270
        <212> DNA
        <213> Homo sapien

        <400> 49
```
agcggccgcc cgggcaggtc tgatattagt agctttgcaa ccctgataga gtaaataaat         60
tttatgggcg ggtgccaaat actgctgtga atctatttgt atagtatcca tgaatgaatt        120
tatggaaata gatatttgtg cagctcaatt tatgcagaga ttaaatgaca tcataatact        180
ggatgaaaac ttgcatagaa ttctgattaa atagtgggtc tgtttcacat gtgcagtttg        240
aagtatttaa attaaccact cctttcacag                                         270
```

        <210> 50
        <211> 271
        <212> DNA
        <213> Homo sapien

        <400> 50
```
atgcatttat ccatatgaac ttgattattc tgaattactg actataaaaa ggctattgtg         60
aaagatatca cactttgaaa cagcaaatga attttcaatt ttacatttaa ttataagacc        120
acaataaaaa gttgaacatg cgcatatcta tgcatttcac agaagattag taaaactgat        180
```

13

```
ggcaacttca gaattatttc atgaagggta caaacagtct ttaccacaat tttcccatgg    240
tcttatcctt caaaataaaa ttccacacac t                                  271
```

        <210> 51
        <211> 241
        <212> DNA
        <213> Homo sapien

        <400> 51
```
tggtcgcggc cgaggtgtga ggagatgaac tttgtgttaa tggggggcac tttaaatcga     60
aatggcttat ccccaccgcc atgtaagtta ccatgcctgt ctcctccctc ctacacattt    120
ccagctcctg ctgcagttat tcctacagaa gctgccattt accagccctc tgtgattttg    180
aatccacgag cactgcaggc cctccacagc gttactaccc agcaggcact cagctcttca    240
t                                                                  241
```

        <210> 52
        <211> 271
        <212> DNA
        <213> Homo sapien

        <400> 52
```
tccaagactt aaaacttagg aaacacctat gatgccactt taactggaag taatggagac     60
atctgattcc aaattcacat tttaaatgcc tatttgcaat cagcaaagag ccaggtatgc    120
tgcatgctgc ttgctgtaag ttacgatttg cttcactag ctcaaatttt ttcactccac     180
caaaagataa ggcacaggcc cgtttgtcca atcaagtttg ctgaaaatac tgcagcctga    240
gtgtagacaa acttcccctg aatttgctag a                                  271
```

        <210> 53
        <211> 493
        <212> DNA
        <213> Homo sapien

        <400> 53
```
ttagcgtggt cgcggtccga ggtctggcct gactagctca ctctgaagag tgtctttcac     60
atggattaac caaaaaatgc attactgcct ttggcacact gtcttgaata ttctttctga    120
caatgagaaa atatgattta atggagtcgt tcaataacct cacaatctcg ctgttccgag    180
cagatagttt tcgtgccaac aggaactggc acatctagca ggttcacggc atgacctttt    240
tgtggactgg ctggcataat tggaatgggt tttgattttt cttctgctaa taactcttca    300
agcttttgaa gttttcaagc attcctctcc agttgcctgt ggttggttct tgaacaccat    360
ctccaacccc accacctcca gatgcaacct tgtctcgtga tacagacctg cccgggcggc    420
cctcaagggc gaattctgca gatatccatc acactggcgg ccgctcgagc atgcatctag    480
agggcccaat tcg                                                      493
```

        <210> 54
        <211> 321
        <212> DNA
        <213> Homo sapien

        <400> 54
```
cgtggtcgcg gccgaggtct gtttgcttgt tggtgtgagt ttttcttctg gagactttgt     60
actgaatgtc aataaactct gtgattttgt taggaagtaa aactgggatc tatttagcca    120
ctggtaagct tctgaggtga aggattcagg gacatctcgt ggaacaaaca ctccccactg    180
gactttctct ctggagatac ccttttgaat atacaatggc cttggctcac taggtttaaa    240
tacaaacaag tctgaaaccc actgaagact gagagattgc agcaatattc tctgaattag    300
gatcgggttc cataactcta a                                            321
```

14

```
<210> 55
<211> 281
<212> DNA
<213> Homo sapien

<400> 55
ttgcaaatga aactgtggat gtataataag aaaacacaag ggtttattct taacactaaa        60
attaacatgc cacacgaaga ctgcattaca gctctctgtt tctgtaatgc agaaaaatct       120
gaacagccca ccttggttac agctagcaaa gatggttact tcaaagtatg gatattaaca       180
gatgactctg acatatacaa aaaagctgtt ggctggacct gtgactttgt tggtagttat       240
cacaagtatc aagcaactaa ctgttgtttc tccgaagatg g                           281


<210> 56
<211> 612
<212> DNA
<213> Homo sapien

<400> 56
gcgtggtcgc ggccgaggtc ctgtccgggg gcactgagaa ctccctctgg aattcttggg        60
gggtgttggg gagagactgt gggcctggag ataaaacttg tctcctctac caccaccctg       120
taccctagcc tgcacctgtc ctcatctctg caaagttcag cttccttccc caggtctctg       180
tgccactctg tcttggatgc tctggggagc tcatgggtgg aggagtctcc accagaggga       240
ggctcagggg actggttggg ccagggatga atatttgagg gataaaaatt gtgtaagagc       300
caaagaattg gtagtagggg gagaacagag aggagctggg ctatgggaaa tgatttgaat       360
aatggagctg ggaatatggc tggatatctg gtactaaaaa agggtctta agaacctact       420
tcctaatctc ttccccaatc caaaccatag ctgtctgtcc agtgctctct tcctgcctcc       480
agctctgccc caggctcctc ctagactctg tccctgggct agggcagggg aggagggaga       540
gcagggttgg gggagaggct gaggagagtg tgacatgtgg ggagaggacc agacctgccc       600
gggcggccgt cg                                                           612


<210> 57
<211> 363
<212> DNA
<213> Homo sapien

<400> 57
gtcgcggccg aggtcctgag cgtcacccta gttctgcccc ttttagctg tgtagacttg        60
gacaagacat ttgacttccc tttctccttg tctataaaat gtggacagtg gacgtctgtc       120
acccaagaga gttgtgggag acaagatcac agctatgagc acctcgcacg gtgtccagga       180
tgcacagcac aatccatgat gcgttttctc cccttacgca ctttgaaacc catgctagaa       240
aagtgaatac atctgactgt gctccactcc aacctccagc gtggatgtcc ctgtctgggc       300
cctttttctg tttttttattc tatgttcagc accactggca ccaaatacat tttaattcac       360
cga                                                                     363


<210> 58
<211> 750
<212> DNA
<213> Homo sapien

<400> 58
cgtggtcgcg gccgaggtct aattccacct gactggcaga acctgcgccc ctcgcctaac        60
ctgcgccctt ctcccaactc gcgtgcctca cagaacccag gtgctgcaca gccccgagat       120
gtggcccttc ttcaggaaag agcaaataag ttggtccaag tacttgatgc ttaaggaata       180
cacaaaggtg cccatcaagc gctcagaaat gctgagagat atcatccgtg aatacactga       240
```

```
tgtttatcca gaaatcattg aacgtgcatg ctttgtccta gagaagaaat ttgggattca    300
actgaaagaa attgacaaag aagaacacct gtatattctc atcagtaccc ccgagtccct    360
ggctggcata ctgggaacga ccaaagacac acccaagctc ggtctcttct tggtgattct    420
gggtgtcatc ttcatgaatg gcaaccgtgc cagtgaggct gtcttttggg aggcactacg    480
caagatggga ctgcgtcctg gggtgagaca tcccctccct tggagatcta aggaaacttc    540
tcacctatga gtttgtaaag cagaaatacc tggactacag acgagtgccc aacagcaacc    600
ccccggagta tgagttcctc tggggcctcc gtccctacca tgagactagc aagatgaaaa    660
tgctgagatt cattgcagag gttcagaaaa gagaccctcg tgactggact gcacagttca    720
tggaggctgc agatgaggac ctgcccgggc                                     750
```

        <210> 59
        <211> 505
        <212> DNA
        <213> Homo sapien

        <400> 59
```
tggccgcccg ggcaggtcca gtctacaagc agagcactct catggggagc accagatgag     60
ttccagccgc agttctttta taagctttaa gtgcctcatg aagacgcgag gatctcttcc    120
aagtgcaacc tggtcacatc agggcacatt cagcagcaga agtctgtttc cagtatagtc    180
cttggtatgg ctaaattcca ctgtcccttt ctcagcagtc aataatccat gataaattct    240
gtacaacact gtagtcaata acagcagcac cagacagcat attaattctt ttaccataaa    300
tttgtgtgta attataatgt tctatgtgtg gtgttatcaa aagaatcact gtgtctctaa    360
atatcatata tgtatgtctg gataaataca ttgctgtaca acatctccaa catgcaggtc    420
atgctctaag acttggggat atagagtaat acatgtttcg tggacctcgg ccgcgaccac    480
gctaagggcg aattctgcag atatc                                          505
```

        <210> 60
        <211> 520
        <212> DNA
        <213> Homo sapien

        <400> 60
```
cgtggtcgcg gccgaggtcc tcaggacaag gaaacaggta tcagcatgat ggtagcagaa     60
accttatcac caaggtgcag gagctgactt cttccaaaga gttgtggttc cgggcagcgg    120
tcattgcctg cccttgctgg agggctgatt ttagtgttgc ttattatgtt ggccctgagg    180
atgcttcgaa gtgaaaataa gaggctgcag gatcagcggc aacagatgct ctcccgtttg    240
cactacagct ttcacggaca ccattccaaa aaggggcagg ttgcaaagtt agacttggaa    300
tgcatggtgc cggtcagtgg gcacgagaac tgctgtctga cctgtgataa aatgagacaa    360
gcagacctca gcaacgataa gatcctctcg cttgttcact ggggcatgta cagtgggcac    420
gggaagctgg aattcgtatg acggagtctt atctgaacta cacttactga acagcttgaa    480
ggacctgccc gggcggccgc tcgaaggggg cgaattctgc                          520
```

        <210> 61
        <211> 447
        <212> DNA
        <213> Homo sapien

        <400> 61
```
agagaggtgt ttttattctt tggggacaaa gccgggttct gtgggtgtag gattctccag     60
gttctccagg ctgtagggcc cagaggctta atcagaattt tcagacaaaa ctggaacctt    120
tctttttttcc cgttggttta tttgtagtcc ttggcaaac caatgtcttt gttcgaaaga    180
gggaaaataa tccaaacgtt tttctttttaa cttttttttt aggttcaggg gcacatgtgt    240
aggcttgcta tataggtaaa ttgcatgtca ccagggtttg ttgtacagat tatttcatca    300
tccagataaa aagcatagta ccagataggt agttttttga tcctcaccct ccttccatgc    360
tccgacctca ggtaggcccc agtgtctgac ctgcccggcg gccgctcga aagggccaat     420
```

16

```
tctgcagata tccatcacac tggccgg                                            447
```

```
        <210> 62
        <211> 83
        <212> PRT
        <213> Homo sapien

        <400> 62
Lys Lys Val Leu Leu Leu Ile Thr Ala Ile Leu Ala Val Ala Val Gly
1               5                   10                  15
Phe Pro Val Ser Gln Asp Gln Glu Arg Glu Lys Arg Ser Ile Ser Asp
            20                  25                  30
Ser Asp Glu Leu Ala Ser Gly Phe Phe Val Phe Pro Tyr Pro Tyr Pro
        35                  40                  45
Phe Arg Pro Leu Pro Pro Ile Pro Phe Pro Arg Phe Pro Trp Phe Arg
    50                  55                  60
Arg Asn Phe Pro Ile Pro Ile Pro Ser Ala Pro Thr Thr Pro Leu Pro
65                  70                  75                  80
Ser Glu Lys
```

```
        <210> 63
        <211> 683
        <212> DNA
        <213> Homo sapien

        <400> 63
acaaagattg gtagctttta tattttttta aaaatgctat actaagagaa aaaacaaaag        60
accacaacaa tattccaaat tataggttga gagaatgtga ctatgaagaa agtattctaa       120
ccaactaaaa aaaatattga aaccactttt gattgaagca aaatgaataa tgctagattt       180
aaaaacagtt tgaaatcaca ctttggtctg taaacatatt tagctttgct tttcattcag       240
atgtatacat aaacttattt aaaatgtcat ttaagtgaac cattccaagg cataataaaa       300
aaagwggtag caaatgaaaa ttaaagcatt tattttggta gttcttcaat aatgatrcga       360
gaaactgaat tccatccagt agaagcatct ccttttgggt aatctgaaca agtrccaacc       420
cagatagcaa catccactaa tccagcacca attccttcac aaagtccttc cacagaagaa       480
gtgcgatgaa tattaattgt tgaattcatt tcagggcttc cttggtccaa ataaattata       540
gcttcaatgg gaagaggtcc tgaacattca gctccattga atgtgaaata ccaacgctga       600
cagcatgcat ttctgcattt tagccgaagt gagccactga acaaaactct tagagcacta       660
tttgaacgca tctttgtaaa tgt                                              683
```

```
        <210> 64
        <211> 749
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(749)
        <223> n = A,T,C or G

        <400> 64
ctgttcattt gtccgccagc tcctggactg gatgtgtgaa aggcatcaca tttccatttt        60
cctccgtgta aatgttttat gtgttcgcct actgatccca ttcgttgctt ctattgtaaa       120
tatttgtcat ttgtatttat tatctctgtg tttttcccct aaggcataaa atggtttact       180
gtgttcattt gaacccattt actgatctct gttgtatatt tttcatgcca ctgctttgtt       240
```

17

```
ttctcctcag aagtcgggta gatagcattt ctatcccatc cctcacgtta ttggaagcat     300
gcaacagtat ttattgctca gggtcttctg cttaaaactg aggaaggtcc acattcctgc     360
aagcattgat tgagacattt gcacaatcta aaatgtaagc aaagtaagtc attaaaaata     420
caccctctac ttgggcttta tactgcatac aaatttactc atgagccttc ctttgaggaa     480
ggatgtggat ctccaaataa agatttagtg tttattttga gctctgcatc ttancaagat     540
gatctgaaca cctctccttt gtatcaataa atagccctgt tattctgaag tgagaggacc     600
aagtatagta aaatgctgac atctaaaact aaataaatag aaaacaccag gccagaacta     660
tagtcatact cacacaaagg gagaaattta aactcgaacc aagcaaaagg cttcacggaa     720
atagcatgga aaaacaatgc ttccagtgg                                       749
```

```
        <210> 65
        <211> 612
        <212> DNA
        <213> Homo sapien


        <400> 65
acagcagcag tagatggctg caacaacctt cctcctaccc cagcccagaa aatatttctg      60
ccccacccca ggatccggga ccaaaataaa gagcaagcag gcccccttca ctgaggtgct     120
gggtagggct cagtgccaca ttactgtgct ttgagaaaga ggaaggggat ttgtttggca     180
ctttaaaaat agaggagtaa gcaggactgg agaggccaga gaagatacca aaattggcag     240
ggagagacca tttggcgcca gtcccctagg agatgggagg agggagatag gtatgagggt     300
aggcgctaag aagagtagga ggggtccact ccaagtggca gggtgctgaa atgggctagg     360
accaacagga cactgactct aggtttatga cctgtccata cccgttccac agcagctggg     420
tgggagaaat caccattttg tgacttctaa taaaataatg ggtctaggca acagttttca     480
atggatgcta aaacgattag gtgaaaagtt gatggagaat tttaattcag gggaattagg     540
ctgataccat ctgaaaccat ttggcatcat taaaaatgtg acaacctggt ggctgccagg     600
gaggaagggg ag                                                         612
```

```
        <210> 66
        <211> 703
        <212> DNA
        <213> Homo sapien


        <400> 66
tagcgtggtc gcggccgagg tacattgatg ggctggagag cagggttggc agcctgttct      60
gcacagaacc aagaattaca gaaaaaagtc caggagctgg agaggcacaa catctccttg     120
gtagctcagc tccgccagct gcagacgcta attgctcaaa cttccaacaa agctgcccag     180
accagcactt gtgttttgat tcttcttttt tccctggctc tcatcatcct gcccagcttc     240
agtccattcc agagtcgacc agaagctggg tctgaggatt accagcctca cggagtgact     300
tccagaaata tcctgaccca caaggacgta acagaaaatc tggagaccca agtggtagag     360
tccagactga gggagccacc tggagccaag gatgcaaatg gctcaacaag gacactgctt     420
gagaagatgg gagggaagcc aagacccagt gggcgcatcc ggtccgtgct gcatgcagat     480
gagatgtgag ctggaacaga ccttcctggc ccacttcctg atcacaagga atcctgggct     540
tccttatggc tttgcttccc actgggattc ctacttaggt gtctgccctc aggggtccaa     600
atcacttcag gacaccccaa gagatgtcct ttagtctctg cctgaggcct agtctgcatt     660
tgtttgcata tatgagaggg tacctgcccg ggcggccgct cga                       703
```

```
        <210> 67
        <211> 1022
        <212> DNA
        <213> Homo sapien


        <400> 67
cttgagaaag caggattgtt ttaagttcca agatttaaca aacttactgt tcagcatcat      60
attcaagcct aaaaggaaga taggattttc aagatatatt tccaacttct ttaacatggc     120
```

18

```
accatggatg aactgtttct cagcactgtg ctgcttcact tggaattaag gatgaattgg      180
gaggagacag tatgacatag gtgggtaggt tgggtggtga ggggaaccag ttctaatagt      240
cctcaactcc actccagctg ttcctgttcc acacggtcca ctgagctggc ccagtccctt      300
tcactcagtg tgtcaccaaa ggcagcttca aggctcaatg gcaagagacc acctataacc      360
tcttcacctt ctgctgcctc tttctgctgc cactgactgc catggccatc tgctatagcc      420
gcattgtcct cagtgtgtcc aggccccaga caaggaaggg gagccatggt gagactccaa      480
ttcccaggcc ttaatcctta accctagacc tgttgcctct agcatcattt atttatctac      540
ctacctaata gctatctacc agtcattaaa ccatggtgag attctaacca tgtctagcac      600
ctgatgctag agataatttt gttgaatccc ttcaattata aacagctgag ttagctggac      660
aaggactagg gaggcaatca gtattattta ttcttgaaca ccatcaagtc tagacttggt      720
ggcttcatat ttctatcata atccctgggg gtaagaaatc atatagcccc aggttgggaa      780
ggggaaaacg gtttgcaaca ttctcctcct tgtaggaggc gagctctgtc tcactagcta      840
tgcccctcca tcaattcacc ctatactcag atcagaagct gagtgtctga attacagtat      900
attttctaaa ttcctagccc ctgctggtga atttgccctc ccccgctcct ttgacaattg      960
tccccgtgtt cgtctccggg ccctgagact ggccctgctt atcttgctga ccttcatcct     1020
ct                                                                     1022
```

```
        <210> 68
        <211> 449
        <212> DNA
        <213> Homo sapien

        <400> 68
ccagatccat tttcagtggt ctggatttct ttttattttc ttttcaactt gaaagaaact       60
ggacattagg ccactatgtg ttgttactgc cactagtgtt caagtgcctc ttgtttttccc     120
agagatttcc tgggtctgcc agaggcccag acaggctcac tcaagctctt taactgaaaa      180
gcaacaagcc actccaggac aaggttcaaa atggttacaa cagcctctac ctgtcgcccc      240
agggagaaag gggtagtgat acaagtctca tagccagaga tggttttcca ctccttctag      300
atattcccaa aaagaggctg agacaggagg ttattttcaa ttttattttg gaattaaata      360
cttttttccc tttattactg ttgtagtccc tcacttggat atacctctgt tttcacgata      420
gaaataaggg aggtctagag cttctattc                                        449
```

```
        <210> 69
        <211> 387
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(387)
        <223> n = A,T,C or G

        <400> 69
gcccttagcg tgggtcgcgg cncgangtct ggagcntatg tgatncctat ggtncncagg       60
cnnatactgc tantctcatt tattctcctg cnacctantc ctctnctctg gaatcacacc      120
attattgcct gttaacactg gactgtgagt accangcaat taatttgcac caanaaagtt      180
gagggtatta tcanatattg caatctgtac agagggaaga tgatttcaat ttgatttcaa      240
cttaaccttc atctttgtct gttaacacta atagagggtg tctaataaaa tggcaaattt      300
gngatctcat tnggtataac tacactcttt ttcacagatg tgatgactga atttccanca      360
acctgcccgg gcggncgntc naagggc                                          387
```

```
        <210> 70
        <211> 836
        <212> DNA
        <213> Homo sapien
```

```
        <400> 70
tattccattt acaaaataaa ttcagccctg cactttcttt agatgccttg atttccagaa      60
tggagcttag tgctactgaa taccctggcc acagagccac ctcaggatat tcttttctcc     120
accctagttt atttatttat agatatctgt ttacaaagtc tgtagtaaat cctgatgctg     180
accatctgaa atgtactttt tttctgaatg ctgtttcaat ctaaaatagc agcttttgag     240
aaaacaatga tgtaaattcc ttatgataaa aggatgattc tatatattct ttaatgatat     300
taaatatgcc gaagccaagc acacagtctt tctaaagtgt gtgtatgttt gtgtgaatgt     360
gaatgatact gatcttatat ctgttaaaag ttgtttaaa aagctgtggc atcccattgt      420
tcatatttgc caagtcttct gtaaagatgt ctaggacgaa atattttatg tgctaatgca     480
tgtatttgta aaccagattt gtttaccact caaaattaac ttgttttctt catccaaaaa     540
agtttatttc ttccacgtac ttaaatttc tgtgtgggta taatatagct ttctaatttt      600
tttctttcac aaaggcaggt tcaaaattct gttgaaagaa aaatgctttc tgaaactgag     660
gtataacacc agagcttgct gtttaaagga ttatatgatg tacatcagtt ctataaatgt     720
gctcagcagt ttaacatgtg aatcctgttt taaagtgctc agatttcaac tgtgtaagcc     780
attgatataa cgctgtaatt aaaaatgttt atatgaaaaa aaaaaaaaaa aaaaaa        836

        <210> 71
        <211> 618
        <212> DNA
        <213> Homo sapien

        <400> 71
gttgcagtga gctcaagtgt tgggtgtatc agctcaaaac accatgtgat gccaatcatc      60
tccacaggag caatttgttt accttttttt tctgatgctt tactaacttc atcttttaga     120
tttaaatcat tagtagatcc tagaggagcc agtttcagaa aatatagatt ctagttcagc     180
accaccgta gttgtgcatt gaaataatta tcattatgat tatgtatcag agcttctggt      240
tttctcattc tttattcatt tattcaacaa ccacgtgaca aacactggaa ttacaggatg     300
aagatgagat aatccgctcc ttggcagtgt tatactatta tataacctga aaaaacaaac     360
aggtaatttt cacacaaagt aatagatatc atgacacatt taaaataggg cactactgga     420
acacacagat aggacatcca ggtttgggt caatattgta gacttttgg tggatgagat       480
atgcaggttg atrccagaag gacaacaaaa acatatgtca gatagaaggg aggagcaaat     540
gccaagagct ggagctgagg aagatcactg tgaaattcta tgtagtctag ttggctggat     600
gctagagcaa agaggtgg                                                  618

        <210> 72
        <211> 806
        <212> DNA
        <213> Homo sapien

        <400> 72
tctacgatgg ccatttgctc attgtctttc ctctgtgtgt agtgagtgac cctggcagtg      60
tttgcctgct cagagtggcc cctcagaaca acagggctgg ccttggaaaa accccaaaac     120
aggactgtgg tgacaactct ggtcaggtgt gatttgacat gagggccgga ggcggttgct     180
gacggcagga ctggagaggc tgcgtgcccg gcactggcag cgaggctcgt gtgtcccccca    240
ggcagatctg ggcactttcc caacccaggt ttatgccgtc tccagggaag cctcggtgcc     300
agagtggtgg gcagatctga ccatccccac agaccagaaa caaggaattt ctgggattac     360
ccagtccccc ttcaacccag ttgatgtaac cacctcattt tttacaaata cagaatctat     420
tctactcagg ctatgggcct cgtcctcact cagttattgc gagtgttgct gtccgcatgc     480
tccgggcccc acgtggctcc tgtgctctag atcatggtga ctccccccgcc ctgtggttgg    540
aatcgatgcc acggattgca ggccaaattt cagatcgtgt ttccaaacac ccttgctgtg     600
ccctttaatg ggattgaaag cactttttacc acatggagaa atatattttt aatttgtgat     660
gcttttctac aaggtccact atttctgagt ttaatgtgtt tccaacactt aaggagactc     720
taatgaaagc tgatgaattt tctttttctgt ccaaacaagt aaaataaaaa taaaagtcta     780
tttagatgtt gaaaaaaaaa aaaaaa                                         806
```

20

```
            <210> 73
            <211> 301
            <212> DNA
            <213> Homo sapien

            <220>
            <221> misc_feature
            <222> (1)...(301)
            <223> n = A,T,C or G

            <400> 73
actctggtaa gcttgttgtt gtccaagtga agctccctca gatgaggcgt gttggccana        60
gagccattgt caacagcaga gatgctgttg aaactcaatc ccaacttagc caaattattc       120
agtcctttca ggctagctgc atcaactctg ctgattttgt tgccatcaag atgtaattcc       180
gtaagggaag gaggaagacc ttgaggaatg ctggygatat tggyatcagc aatgcggatg       240
tasgaagagc ttcttcmttc cctggaaagc cccattttca atyccttgag ctcttcakcg       300
g                                                                       301

            <210> 74
            <211> 401
            <212> DNA
            <213> Homo sapien

            <400> 74
agtttacatg atccctgtaa cagccatggt ctcaaactca gatgcttcct ccatctgcca        60
agtgtgttct ggatacagag cacatcgtgg cttctggggt cacactcagc ttaggctgtg       120
ggtccacaga gcactcatct ggctgggcta tggtggtggt ggctctactc aagaagcaaa       180
gcagttacca gcacattcaa acagtgtatt gaacatcttt taaatatcaa agtgagaaac       240
aagaaggcaa cataataatg ttatcagaaa gatgttagga agtaaggaca gctgtgtaaa       300
gcttgaggct gaaaagtagc ttgccagctt catttctttg gtttcttggg tagtgggccg       360
ccggaacagc aagatgtgag gttctggttc atggatcata t                          401

            <210> 75
            <211> 612
            <212> DNA
            <213> Homo sapien

            <400> 75
ttattttttca attttattt tggttttctt acaaaggttg acattttcca taacaggtgt        60
aagagtgttg aaaaaaaaat tcaaattttt ggggagcgag ggaaggagtt aatgaaactg       120
tattgcacaa tgctctgatc aatccttctt tttctctttt gcccacaatt taagcaagta       180
gatgtgcaga agaaatggaa ggattcagct ttcagttaaa aaagaagaag aagaaatggc       240
aaagagaaag ttttttcaaa tttctttctt ttttaattta gattgagttc atttatttga       300
aacagactgg gccaatgtcc acaaagaatt cctggtcagc accaccgatg tccaaaggtg       360
caatatcaag gaagggcagg cgtgatggct tatttgtttt gtattcaatg attgtctttc       420
cccattcatt tgtctttta gagcagccat ctacaagaac agtgtaagtg aacctgctgt       480
tgccctcagc aacaagttca acatcattag agccctgtag aatgacagcc ttttttcaggt      540
tgccagtctc ctcatccatg tatgcaatgc tgttcttgca gtggtaggtg atgttctgag       600
aggcatagtt gg                                                           612

            <210> 76
            <211> 844
            <212> DNA
            <213> Homo sapien
```

21

```
        <400> 76
ggctttcgag cggccgcccg ggcaggtctg atggttctcg taaaaacccc gctagaaact        60
gcagagacct gaattctgc catcctgaac tcaagagtgg agaatactgg gttgaccca         120
accaaggatg caaattggat gctatcaagg tattctgtaa tatggaaact ggggaaacat       180
gcataagtgc caatcctttg aatgttccac ggaaacactg gtggacagat tctagtgctg       240
agaagaaaca cgtttggttt ggagagtcca tggatggtgg ttttcagttt agctacggca       300
atcctgaact tcctgaagat gtccttgatg tgcagcykgc attccttcga cttctctcca       360
gccgagcttc ccagaacatc acatatcact gcaaaaatag cattgcatac atggatcagg       420
ccagtggaaa tgtaaagaag gccctgaagc tgatggggtc aaatgaaggt gaattcaagg       480
ctgaaggaaa tagcaaattc acctacacag ttctggagga tggttgcacg aaacacactg       540
gggaatggag caaaacagtc tttgaatatc gaacacgcaa tgctgttcct tgacattgca       600
ccaccaatgt ccagaggtgc aatgtcaagg aacggcaggc gagatggctt atttgttttg       660
tattcaatga ttgtcttgcc ccattcattt gtcttttgg agcagccatc gactaggaca        720
gagtaggtga acctgctgtt gccctcagca acaagttcca catcgttgga accctgcaga       780
agcacagcct tgttcaarct gcccgtctcc tcatccagat acctcggccg cgaccacgct       840
aatc                                                                     844


        <210> 77
        <211> 314
        <212> DNA
        <213> Homo sapien


        <400> 77
ccagtcctcc acttggcctg atgagagtgg ggagtggcaa gggacgtttc tcctgcaata        60
gacacttaga tttctctctt gtgggaagaa accacctgtc catccactga ctcttctaca       120
ttgatgtgga aattgctgct gctaccacca cctcctgaag aggcttccct gatgccaatg       180
ccagccatcc tggcatcctg gccctcgagc aggctgcggt aagtagcgat ctcctgctcc       240
agccgtgtct ttatgtcaag cagcatcttg tactcctggt tctgagcctc catctcgcat       300
cggagctcac tcag                                                         314


        <210> 78
        <211> 548
        <212> DNA
        <213> Homo sapien


        <400> 78
accaagagcc aagtgttaca caggatattt taaaaataaa atgttttgg aatcctcacc         60
tcccatgcta tcttctaaga taactacaaa tattcttcaa agatttaact gagttctgcc       120
aaggacctcc caggactcta tccagaatga ttattgtaaa gctttacaaa tcccaccttg       180
gccctagcga taattaggaa atcacaggca aacctcctct ctcggagacc aatgaccagg       240
ccaatcagtc tgcacattgg ttttgttaga tactttgtgg agaaaaacaa aggctcgtga       300
tagtgcagct ctgtgcctac agagagcctc ccttttggtt ctgaaattgc tgatgtgaca       360
gagacaaagc tgctatgggt ctaaaacctt caataaagta actaatgaca ctcaaggtcc       420
tgggactctg agacagacgg tggtaaaacc cacagctgcg attcacattt ccaatttatt       480
ttgagctctt tctgaagctg ttgcttccta cctgagaatt cccatttaga gagctgcaca       540
gcacagtc                                                                 548


        <210> 79
        <211> 646
        <212> DNA
        <213> Homo sapien


        <400> 79
accccgtcac tatgtgaata aaggcagcta gaaaatggac tcaattctgc aagccttcat        60
```

22

```
ggcaacagcc catattaaga cttctagaac aagttaaaaa aaatcttcca tttccatcca      120
tgcatgggaa aagggcttta gtatagttta ggatggatgt gtgtataata ataaaatgat      180
aagatatgca tagtggggga ataaagcctc agagtccttc cagtatgggg aatccattgt      240
atcttagaac cgagggattt gtttagattg ttgatctact aatttttttc ttcacttata      300
tttgaatttt caatgatagg acttattgga aattggggat aattctgttg tggtattaaa      360
taatattcat tttttaaaaa ctcatcttgg tattgagtta gtgcattgac ttccaatgaa      420
ttgacataag cccatatttc attttaacca gaaacaaaaa ctagaaaatg ttactcccta      480
aataggcaac aatgtatttt ataagcactg cagagattta gtaaaaaaca tgtatagtta      540
ctttagaaac aacttctgac acttgagggt tacccaatgg tctccttccc attctttata      600
tgaggtaaat gcaaaccagg gagccaccga ataaacagcc ctgagt                     646
```

```
        <210> 80
        <211> 276
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(276)
        <223> n = A,T,C or G

        <400> 80
gtctgaatga gcttcnctgc gagatggganc ancataaccc agaantccaa aancntanng      60
aacgnnaaaa cccgntngaa caagnaaacn gcaactnacg gccgcctgnt gnagggcgag      120
gacgcccacc tctcctcctc ccagttctcc tctggatcgc agncatccan agatgtgacc      180
tcttccagcc gccaaatccg caccaaggtc atggatgtgc acgatggcaa ggtgggtgtc      240
cacccacgaa caggtccttc gcaccaagaa ctgagg                                276
```

```
        <210> 81
        <211> 647
        <212> DNA
        <213> Homo sapien

        <400> 81
gtcctgcctt tcatcttttc tttaaaaaaa ataaatgttt acaaaacatt tccctcagat      60
tttaaaattc atggaagtaa taaacagtaa taaaatatgg atactatgaa aactgacaca      120
cagaaaaaca taaccataaa atattgttcc aggatacaga tattaattaa gagtgacttc      180
gttagcaaca cgtagacatt catacatatc cggtggaaga ctggtttctg agatgcgatt      240
gccatccaaa cgcaaatgct tgatcttgga gtaggrtaat ggccccagga tcttgcagaa      300
gctctttatg tcaaacttct caagttgatt gacctccagg taatagtttt caaggttttc      360
attgacagtt ggtatgtttt taagcttgtt ataggacaga tccagctcaa ccaggatga      420
cacattgaaa gaatttccag gtattccact atcagccagt tcgttgtgag ataaacgcag      480
atactgcaat gcattaaaac gcttgaaata ctcatcaggg atgttgctga tcttattgtt      540
gtctaagtag agagttagaa gagagacagg gagaccagaa ggcagtctgg ctatctgatt      600
gaagctcaag tcaaggtatt cgagtgattt aagaccttta aaagcag                    647
```

```
        <210> 82
        <211> 878
        <212> DNA
        <213> Homo sapien

        <400> 82
ccttctttcc ccactcaatt cttcctgccc tgttattaat taagatatct tcagcttgta      60
gtcagacaca atcagaatya cagaaaaatc ctgcctaagg caaagaaata taagacaaga      120
ctatgatatc aatgaatgtg ggttaagtaa tagattccca gctaaattgg tctaaaaaag      180
```

23

```
aatattaagt gtggacagac ctatttcaaa ggagcttaat tgatctcact tgttttagtt    240
ctgatccagg gagatcaccc ctctaattat ttctgaactt ggttaataaa agtttataag    300
atttttatga agcagccact gtatgatatt ttaagcaaat atgttattta aaatattgat    360
ccttcccttg gaccaccttc atgttagttg ggtattataa ataagagata caaccatgaa    420
tatattatgt ttatacaaaa tcaatctgaa cacaattcat aaagatttct cttttatacc    480
ttcctcactg gccccctcca cctgcccata gtcaccaaat tctgttttaa atcaatgacc    540
taagatcaac aatgaagtat tttataaatg tatttatgct gctagactgt gggtcaaatg    600
tttccatttt caaattattt agaattctta tgagtttaaa atttgtaaat ttctaaatcc    660
aatcatgtaa aatgaaactg ttgctccatt ggagtagtct cccacctaaa tatcaagatg    720
gctatatgct aaaaagagaa aatatggtca agtctaaaat ggctaattgt cctatgatgc    780
tattatcata gactaatgac atttatcttc aaaacaccaa attgtcttta gaaaaattaa    840
tgtgattaca ggtagagaac ctcggccgcg accacgct                            878
```

        <210> 83
        <211> 645
        <212> DNA
        <213> Homo sapien

        <400> 83
```
acaaacattt tacaaaaaag aacattacca atatcagtgg cagtaagggc aagctgaaga     60
ataaatagac tgagtttccg ggcaatgtct gtcctcaaag acatccaaac tgcgttcagg    120
cagctgaaac aggcttcttt cccagtgaca agcatgtgtg gtcagtaata caaacgatgg    180
taaatgaggc tactacatag gcccagttaa caaactcctc ttctcctcgg gtaggccatg    240
atacaagtgg aactcatcaa ataatttaaa cccaaggcga taacaacgct atttcccatc    300
taaactcatt taagccttca caatgtcgca atggattcag ttacttgcaa acgatcccgg    360
gttgtcatac agatacttgt ttttacacat aacgctgtgc catccttcc ttcactgccc     420
cagtcaggtt tcctgttgtt ggaccgaaag gggatacatt ttagaaatgc ttccctcaag    480
acagaagtga gaaagaaagg agaccctgag gccaggatct attaaacctg gtgtgtgcgc    540
aaaagggagg gggaaggcag gaatttgaaa ggataaacgt ctcctttgcg ccgaggaatc    600
aggaagcgtg actcacttgg gtctgggacg ataccgaaat ccggt                    645
```

        <210> 84
        <211> 301
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(301)
        <223> n = A,T,C or G

        <400> 84
```
tctgatgtca atcacaactt gaaggatgcc aatgatgtac caatccaatg tgaaatctct     60
cctcttatct cctatgctgg agaaggatta gaaggttatg tggcagataa agaattccat    120
gcacctctaa tcatcgatga gaatggagtt catgggctgg tgaaaaatgg tatttgaacc    180
agataccaag ttttgtttgc cacgatagga atagctttta tttttgatag accaactgtg    240
aacctacaag acgtcttgga caactgaagn ttaaatatcc acangggttt attttgcttg    300
g                                                                    301
```

        <210> 85
        <211> 296
        <212> DNA
        <213> Homo sapien

        <220>

24

```
<221> misc_feature
<222> (1)...(296)
<223> n = A,T,C or G

<400> 85
agcgtgggtc gcggcncgan gtagagaacc gactgaaacg tttgagatga agaaagttct    60
cctcctgatc acagccatct tggcagtggc tgttggtttc ccagtctctc aagaccagga   120
acgagaaaaa agaagtatca gtgacagcga tgaattagct tcagggtttt ttgtgttccc   180
ttacccatat ccatttcgcc cacttccacc aattccattt ccaagatttc catggtttan   240
acgtaatttt cctattccaa tacctgaatc tgccctaca actccccttc ctagcg        296


<210> 86
<211> 806
<212> DNA
<213> Homo sapien

<400> 86
tctacgatgg ccatttgctc attgtctttc ctctgtgtgt agtgagtgac cctggcagtg    60
tttgcctgct cagagtggcc cctcagaaca cagggctgg ccttggaaaa accccaaaac    120
aggactgtgg tgacaactct ggtcaggtgt gatttgacat gagggccgga ggcggttgct   180
gacggcagga ctggagaggc tgcgtgcccg gcactggcag cgaggctcgt gtgtccccca   240
ggcagatctg ggcactttcc caacccaggt ttatgccgtc tccagggaag cctcggtgcc   300
agagtggtgg gcagatctga ccatccccac agaccagaaa caaggaattt ctgggattac   360
ccagtccccc ttcaacccag ttgatgtaac cacctcattt tttacaaata cagaatctat   420
tctactcagg ctatgggcct cgtcctcact cagttattgc gagtgttgct gtccgcatgc   480
tccgggcccc acgtggctcc tgtgctctag atcatggtga ctcccccgcc ctgtggttgg   540
aatcgatgcc acggattgca ggccaaattt cagatcgtgt ttccaaacac ccttgctgtg   600
ccctttaatg ggattgaaag cacttttacc acatggagaa atatattttt aatttgtgat   660
gcttttctac aaggtccact atttctgagt ttaatgtgtt tccaacactt aaggagactc   720
taatgaaagc tgatgaattt tcttttctgt ccaaacaagt aaaataaaaa taaaagtcta   780
tttagatgtt gaaaaaaaaa aaaaaa                                        806


<210> 87
<211> 620
<212> DNA
<213> Homo sapien

<400> 87
ttttgcatc agatctgaaa tgtctgagag taatagtttc tgttgaattt ttttttgttc    60
atttttctgc acagtccatt ctgtttttat tactatctag gcttgaaata tatagtttga   120
aattatgaca tccttcctct ttgttatttt cctcatgatt gctttggcta ttcaaagttt   180
attttagttt catgtaaatt tttgaattgt attttccatt attgtgaaaa tagtaccact   240
gcaattttaa taggaagttt attgaatcta tagattactt tggataatat ggcacttcaa   300
taatattcat gttttcaatt catagacaaa atattttaaa atttattgt atcttttcta    360
attttttcctt tttttattgt aaagatttac ctccttggtt aatattttcc tcagaaattt   420
attatttaag gtatagtcaa taaaattttc ttcctctatt ttgtcagata gtttaagtgt   480
atgaaaccat agatatactt gtatgttaat tttatatttt gctaatttac tgagtgtatt   540
tattagttta gagaggtttt aatgtactgt ttatggtttt ttaaatataa gattacttat   600
tttttaaaaa aaaaaaaaaa                                               620


<210> 88
<211> 308
<212> DNA
<213> Homo sapien
```

25

```
      <220>
      <221> misc_feature
      <222> (1)...(308)
      <223> n = A,T,C or G

      <400> 88
tagctgtgnt cagcaggccg aggttttttt ttttttttgag atggagtctc gccctgtcac         60
ccaggctgga gtgcagtggc ctgatctcag ctcactgcaa gctccacctc ctggattcac        120
gctattctcc tgcctcagcc tcccaagtag ctgggactac aggcgcccgc caccacgccc        180
agctaattnt ttgnattttt agtacnagat gcggtttcat cgtgttagcc agcatggnct        240
cgatctcctg acctcgtgaa ctgcccgcct cggcctccca aagacctgcc cgggcnggcc        300
gctcgaaa                                                                  308

      <210> 89
      <211> 492
      <212> DNA
      <213> Homo sapien

      <220>
      <221> misc_feature
      <222> (1)...(492)
      <223> n = A,T,C or G

      <400> 89
agcggccgcc cgggcaggtc tgttaagtaa catacatatc accttaataa aaatcaagat         60
gaaatgtttt agaaactatt ttatcaaaag tggctctgat acaaagactt gtacatgatt        120
gttcacagca gcactattaa tgccaaaaag tagacaaaac ctaaatgtcc attaactgat        180
aagcaaaatg tggtatatcc atacaatgga atattatgta gcccacaaca tggcatggag        240
tactacaaca tggatgagcc tcaaaaacgt tatgctaaat gaaaaaagtc agatatagga        300
aaccacatgt catatgatcc catttatatg aaatagccag aaaaggcaag tcatagaaac        360
aagatagatc ggaaatgggg ttggaggact acaaatggca ccagggatct ttgaagttga        420
tggaaatggt ctaaaatcag actgtggntg tggttgaaca agtctgtaaa tttaccaaaa        480
tgcgttaata ca                                                             492

      <210> 90
      <211> 390
      <212> DNA
      <213> Homo sapien

      <220>
      <221> misc_feature
      <222> (1)...(390)
      <223> n = A,T,C or G

      <400> 90
tcgagcggcc gcccgggcag gtacaagctt tttttttttt tttttttttt ttttctaaca         60
gttctctgtt ttattgcaat acagcaaagt ctggttaata ttaagngata tcaacataaa        120
gtattggtga ggagtctttt gtgacatttt ttaccatccc accttaaata tttctgtgca        180
aaanaatcca catcattgtt tggtancana ggatctctta aaaagttccc taanacactg        240
agggcataaa accaaacaaa ataaaataag gagtgatagg ctaaagcagt atcttcccct        300
ccatccacat ttgncaagca ttatattcta accaaaaaat gatcacacca ggccatgcaa        360
aactgtccaa tattaccgag aaaaaaccct                                          390

      <210> 91
      <211> 192
```

26

```
        <212> DNA
        <213> Homo sapien

        <400> 91
agcgtggtcg cggccgaggt ctgtcaatta atgctagtcc tcaggattta aaaaataatc        60
ttaactcaaa gtccaatgca aaaacattaa gttggtaatt actcttgatc ttgaattact       120
tccgttacga aagtccttca catttttcaa actaagctac tatatttaag gcctgcccgg       180
gcggccgctc ga                                                            192


        <210> 92
        <211> 570
        <212> DNA
        <213> Homo sapien


        <220>
        <221> misc_feature
        <222> (1)...(570)
        <223> n = A,T,C or G

        <400> 92
agcgtggtcg cggccgaggt ctgacaacta acaaagaagc aaaaactggc atcttggaca        60
tcctagtatt acacttgcaa gcaattagaa cacaaggagg gccaaggaaa aagtttagct       120
ttgaatcact tccaaatcta ctgattttga ggttccgcag tagttctaac aaaacttttc       180
agacaatgtt aactttcgat taagaaagaa aaaaacccca aacatcttca ggaattccat       240
gccaggttca gtctcttcca gtgagcccgc ttgctaaaag tccacgtgca ccattaatta       300
gctgggctgg cagcaccatg taaaaagaag cctattcacc accaaccaca cagactagac       360
atgtaaagta ggatcaagta atggatgaca accatggtcg tggaatatgg tcaatgagag       420
tcagaaaagt acaggcacca gtacaagcag cagataacag aattgacggg ccaaaggata       480
aaaataggct tatttaaata ggatgctaca gaacacatnc acttctaatt ggaagctgct       540
ttacactggg tggcattgna ccatatgcat                                        570


        <210> 93
        <211> 446
        <212> DNA
        <213> Homo sapien


        <220>
        <221> misc_feature
        <222> (1)...(446)
        <223> n = A,T,C or G

        <400> 93
tcgagcggcc gcccgggcag gtccaggttt ttatttagtt gtgtaatctt ggacaagtta        60
cctaactttt ttgagtctga atatatttaa tctgcaaaat gagaatcatg ataatacgtc       120
ataggcttaa ttaggaggat taaatgaaat aatttatagg tggtgccatg gttacataca       180
agtattagta gttaattctt ttcctttgtt tactttata gtataggttg gatgaaggtt        240
ccagtatagg caaaaatact acttgggggt aaagtagagt gtgatacttt atttgaaatg       300
ttccctgaat ctgatctta cttttgnta ctgctgcact acccaaatcc aaattttcat         360
cccaacattc ttggatttgt gggacagcng tagcagcttt tccaatataa tctatactac       420
atctttcttt actttggtgc tttttg                                            446


        <210> 94
        <211> 409
        <212> DNA
        <213> Homo sapien
```

27

```
        <400> 94
cgagcggccg cccgggcagg tccatcagct cttctgctta gaatacgagg cagacagtgg      60
agaggtcaca tcagttatcg tctatcaggg tgatgaccca agaaaggtga gtgagaaggt     120
gtcggcacac acgcctctgg atccacccat gcgagaagcc ctcaagttgc gtatccagga     180
ggagattgca aagcgccaga gccaacactg accatgttga aggcgttctc tccaggctgg     240
attcactgca ctcggaagaa ttctgcccag ggaatttagt gtgggggtac caggaccagt     300
ttgtcttgat cttgagaccc ccagagctgc tgcatccata gggtgttgca ggactacacc     360
tggcctgcct tgcagtcatt ctttcttata tgttgaccca tttgcccaa                409
```

```
        <210> 95
        <211> 490
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(490)
        <223> n = A,T,C or G

        <400> 95
tcgagcggcc gcccgggcag gtcctacttg tttgcagctt ccacacactg cacctaccta      60
ctacctctct tccatgctta actgggttta gaaaggtgag ctatgcgtag aagaactact     120
tgggatattc aagtgctgta tttgaacgat aagcctatag ataacagtct gaagctgcaa     180
gggagacttt gttagtacac tactataaac aggtaaacta cctgtttgta cttgatatag     240
tgcatatgaa atgactgatt taatacaaaa ctacagaaca tgcaaaattt tttctgagat     300
gttaagtatt acttcagtgg agaacaaaac ttacttaacc tttcgctaat gcatgtagta     360
ccagaaagca aacatggttt tagcttcctt tactcaaaat atgaacatta agtggttgtg     420
aattttgtct gccaagtggt tcagaaaata cattataaat aacctaagtt aaaaaaaaga     480
aactgngaac                                                            490
```

```
        <210> 96
        <211> 223
        <212> DNA
        <213> Homo sapien

        <400> 96
agcgtggtcg cggccgaggt ctggaagccc accctaggac ttgaatggca ccttgtcctt      60
tctctgccag taatgcaatc caacacaata tgctacaggg aaaacagaat ttccacggtg     120
ccgccctctg gtacaaggga aacagcacgc aaagcaaaag gccacagagg gctccctgag     180
aatccagtac aactaagcga ggacctgccc gggcggccgc tcg                      223
```

```
        <210> 97
        <211> 527
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(527)
        <223> n = A,T,C or G

        <400> 97
tcgagcggcc gcccgggcag gtctgtgcag gagacactga agtgggtagt gtccataatc      60
tttttagcct gttgctgaaa ttccagttgt actccttcaa accaaaatgc ttacaggatc     120
```

28

```
atgggaaagc ctcggttgca gaaatcaaga caggcaagtg ggaagataac tcggctttga    180
ggttaaacag atctgggttc aaagcatagt ttcactctct gtcttgtgaa gtgtcctggg    240
tgaagtcatt tcctctcttg aatttcagag aggatgaaaa tataaaaagt ataataacta    300
tcttcataat ctttgtgagg attaaagaag acgaagtgtg tgaaaagcta agcacagagc    360
aggcattcta caataagtag ttattatttt tggaaccatc ccgnccctag ccccagccca    420
attaccttct cttagnctct tcatatcgaa ngccgtaatc ttgaccttct cttgcnactg    480
gattggtgct ggttgatgcc caaacttccc gagatgctgt ctgggaa                 527
```

```
        <210> 98
        <211> 514
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(514)
        <223> n = A,T,C or G

        <400> 98
tcgagcggcc gcccgggcag gtctggctcc catggccctt ggggtggcct gactctgtca    60
ctattcctaa aaccttctag gacatctgct ccaggaagaa ctttcaacac caaaattcat    120
ctcaatttta cagatgggaa aagtgattct gagaccagac cagggtcagg ccaaggtcat    180
ccagcatcag tggctgggct gagactgggc ccagggaacc ctgtctgctc ctcttttcc     240
cagagctgtg agttctctag ccaaggctgc actcttgagg gagagccagg aagcatagct    300
gaggccatga caacctcact cttcacctga aaatttaacc cgtggcagag gatccaggca    360
catataggct tcggagccaa acaggacctc ggccgcgacc acgctaagcc gaattccagc    420
acactggcgg ccgttactag tggatcccga gcttnggtac caagcttggc gtaatcatgg    480
gcatagctgg ttcctggggt gaaaatggta tccg                               514
```

```
        <210> 99
        <211> 530
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(530)
        <223> n = A,T,C or G

        <400> 99
tcgagcggcc gcccgggcag gtctgaagaa acaggtataa atttggcagc cagtaatttt    60
gacagggaag ttacagcttg catgacttta aatatgtaaa tttgaaaata ctgaatttcg    120
agtaatcatt gtgctttgtg ttgatctgaa aaatataaca ctggctgtcg aagaagcatg    180
ttcaaaaata tttaattcac ttcaaaatgt catacaaatt atggtggttt ctatgcaccc    240
ctaaagcttc aagtcattta gctcaggtac atactaaagt aatatattaa ttcttccagt    300
acagtggtgt ttcataccat tgacatttgc ataccctaga ataatttaag aaagacatgt     360
gtaatattca caatgttcag aaaagcaagc aaaaggtcaa ggaacctgct ttggttcttc    420
tggagatggn ctcatatcag cttcataaac attcattcta caaaatagta agctaaccat    480
ttgaacccca atttccagat taagcatatt ttctcataaa tnatgaagcc               530
```

```
        <210> 100
        <211> 529
        <212> DNA
        <213> Homo sapien
```

```
        <400> 100
agcgtggtcg cggccgaggt ccaggcacgg tggcttatgt gtgtaatccc agcacttggg        60
gaggctgagg gaggtggatc acttgagtcc aggagtttga gaccagtctg ggcaacatgg       120
cgaaacttca tcactaccaa agaagaaaaa aattagccag gtgtggtggt gtatgcctgt       180
agtcccagat actctggtgg ctgaggtgag aggatagctt gagcccagga aattgaggct       240
gcagtgaact atgattgcac tactgtgctc cagcttgggc aacagagtga gatcttgtct       300
ccaaaagtcc ttgaaggatt ttaggaagtt gttaaaagtc ttgaaacgat gtttgggggc       360
atgttagggt tcttgaatgt ttaattcctc taataactgc ttattcaaga gaagcatttc       420
tgactgggtg cggggcagtg gcttcatgcc ccataatccc agtactttgg gaggctgaag       480
caggaacatt gcttgagccc aggacttcaa gaacagcctg ggtaacata                   529


        <210> 101
        <211> 277
        <212> DNA
        <213> Homo sapien


        <400> 101
tcgagcggcc gcccgggcag gtcgcaggaa gaggatggaa actgaggagt ccaggaagaa        60
gagggaacga gatcttgagc tggaaatggg agatgattat attttggatc ttcagaagta       120
ctgggattta atgaatttgt ctgaaaaaca tgataagata ccagaaatct gggaaggcca       180
taatatagct gattatattg atccagccat catgaagaaa ttggaagaat tagaaaaaga       240
agaagagctg agaacagacc tcggccgcga ccacgct                                277


        <210> 102
        <211> 490
        <212> DNA
        <213> Homo sapien


        <400> 102
gcgtggtcgc ggccgaggtc tgacggcttt gctgtcccag agccgcctaa acgcaagaaa        60
agtcgatggg acagttagag gggatgtgct aaagcgtgaa atcagttgtc cttaattttt       120
agaaagattt tggtaactag gtgtctcagg ctgggttggg ggtccaaagt gtaaggaccc       180
cctgccctta gtggagagct ggagcttgga gacattaccc cttcatcaga aggaatttc        240
ggatgttttc ttgggaagct gtttggtcc ttggaagcag tgagagctgg gaagcttctt        300
ttggctctag gtgagttgtc atgtgggtaa gttgaggtta tcttgggata aagggtcttc       360
tagggcacaa aactcactct aggtttatat tgtatgtagc ttatatttt tactaaggtg         420
tcaccttata agcatctata aattgacttc tttttcttag ttgtatgacc tgccccgggc       480
ggccgctcga                                                              490


        <210> 103
        <211> 490
        <212> DNA
        <213> Homo sapien


        <400> 103
gagcggccgc ccgggcaggt ccaaaccagc ttgctcataa gtcattaacc aaatccatta        60
taggtaattt gttcagttca atgtttacaa ttcttatgga aaaaattagc aacacacaca       120
tttaaaacgt gtgcatttac ctttgcgtga gtgcttaaaa tacatatttc tatttcaaga       180
tgacatttaa aaattattct aatatatcag cagcaaaaat ataatttgca attacaaaaa       240
actaaactag aatccttaag ttattctcat gtttacagtt gtgattcttt aataaatact       300
attatgcagc tctattgttt aagctttctg gatttggttt aaacacatgc atatatattg       360
tcaattgtgg gaagctttac aagttatatt ccatgcactt tttggacaga gttctaacag       420
agccagccag tccacaaaac aggcaagaca aaagttgaat taactggggc aaaataggac       480
tcttatgcaa                                                              490
```

```
<210> 104
<211> 489
<212> DNA
<213> Homo sapien

<400> 104
cgtggtcgcg gccgaggtcc aggctggtct cgaactcctg accttgtgat ctgcccgcct    60
cggcctccca aagtgttggg attacaggca tgagccactg cgcccgaccg agttgaacat   120
ttaatgtcag actaggccag agtttctcaa tcttttatt ctcacttccc aaaggagccg    180
ttggagattt tcccctcaat ctctctcctt catgaaattt cataccacaa atatagtatg   240
ttttatttat gtactgtgac cctttgaagg atcacaaacc aatataatag ttttttctttt   300
taacccgtca aggaccaagt ttttgcccct gttggaaatg cataaactgg actgatgaat   360
tggtatagat ggcttttatc atgaggatca gaaaaacttg aaattccttg gctacgacac   420
tccatattta tcaccgtata gggaggacct tggtatgggg aagtagaaac acttctacac   480
tttacagca                                                           489
```

```
<210> 105
<211> 479
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(479)
<223> n = A,T,C or G

<400> 105
gcgtggtcgc ggccgaggtc tgactggctt cagccccaga agttgagctg gcctttagac    60
aaaataattg cacctccctc tgctgcttat tcccttccgt tttcatttg agtgtgaaca    120
gttagataaa atctgtggct gnctcttcca ccttgctcta gtttccattg ctgtgagcag   180
gccctcctat gccccgcatt tagctacaat gctgtggact cacttgattc ttttttctccg   240
agctttgtct agaaatatgt gaaggtgagg ttaagtgctt ctctgtgtag atccacttag   300
ccctgtctgc tgtctcgatg ggcgttgctt cgtctctcct ctcttccatc ctttccattt   360
gcttctcacc accttctggc ttctttttctt aatgcaataa aggcagtttc taacaaagaa   420
agaatgtggg ctttggagtt agacagacct ggntttaaat tctgcttctg gctctccaa    479
```

```
<210> 106
<211> 511
<212> DNA
<213> Homo sapien

<400> 106
tcgcggccga ggtccaaaac gtggattcca atgacctgcc ttgagcccgc ggttgccagg    60
agttggacct gcagtagtat gggaagctca cggcctaaat accgactgcc ctctgacccc   120
accgtccagc gattctagaa catttctagt aggaaagaca tagcaaggga ttttcatgat   180
tgggaaatac tgggagacaa gctgaagatt tgttaagggc tatgcttctg tcatctttta   240
ggtatttaag gctactcctt tagctagcta ctttgagctg tttaaagtga ctatctccct   300
acacagagtt acacaatgag catctctgaa agagaatatt accctggatt tccaaagatg   360
tactctaaca ggatgaccag gcaaaaggtg acccggggga ggagtctgtt ataacactcg   420
gaccccacatg ttctcaaggc acttcagaac tttgggaaat cattttgtac cggatcctca   480
gaaagcattt atgaaatac acatccttta g                                   511
```

```
<210> 107
<211> 451
<212> DNA
```

31

```
    <213> Homo sapien

    <400> 107
ggccgcccgg gcaggtccag aatatcaaat caaaaggtca caaatgttca cttcctcctc      60
caccctctta catattggat cttcaattgc aatagggagt gtaagatggg cattttagag     120
acgtagttgc atcagcagaa gcaaacccat cttatacaaa tgggttttgg ggataggaaa     180
aggctgctaa aaattcacaa gtcaccattc cccagaagca atgaatagcc gtagaagacc     240
aaggaagatc aacaagtttc caaagtgcta aagccagaga tttggccctt ccaaaatacc     300
accaggacgc ctggacccgt gggctctccg catgtcacca ctgactgcca ggatgctgct     360
gcacctccct tccttgagac acaacagaga gacagtgaag tcacccaaga ctgggatcat     420
cagaggctcc tcatgcttgc tacagagaag c                                    451


    <210> 108
    <211> 461
    <212> DNA
    <213> Homo sapien

    <400> 108
ccgcccgggc aggtcctgaa aacattcaga ctaatcaaaa tggtactact gtaacttctt      60
ataatacata atataaaagt ttttgaaaga tatagacaca attaacccct aaacaacaca     120
ctatctgatt ctcaaaagca atggctattt aacaagatgt aaaaggacaa taacatatca     180
aagaactttc acacacctaa agatagcatt tagcagcaag ttagtcagac aaaacaaaca     240
caaatatttt cacatttcct atgtttgttt ttaactttac ttcataaagc cactgataat     300
tgaggtttct ttcaagtata agatttctaa aattaaaaac tgtttttgac atatttttat     360
aaagaaataa aaagcaaaac gcaatccaac tatttatatg agtccctctt ctccaacagc     420
tttagatggt tttctgagta ctttttttaca cagaatattt t                        461


    <210> 109
    <211> 441
    <212> DNA
    <213> Homo sapien

    <400> 109
ggccgcccgg gcaggtctga ttataagaga aagaaatcca gtgacacgag ggcaggcagg      60
ccccgctctg ctctgatcga gaaaagcttc ctgatgtcag ggagatggaa ctgccaccat     120
cagaaccatg gcactttggg tgaaggtgtg tcagcgacca aggggcaggg aaatgggcag     180
tgactaaggg ggcaggaaac aggcaggcac atggcaaggt tctcccagcc catcagccca     240
gtgatggcct cgattttgaa gctgcactac tgtctgaaaa gcacaattac tggtgactct     300
taacaaactt cagcatactg gggaaggaga ctgtcaagta actgaattgg aaagatgaaa     360
aagaaccatc tctaaaagtt gatgcttgtc agaagaataa cctcctttgt gcaagtcttg     420
caacatcttc attcaaccac a                                               441


    <210> 110
    <211> 451
    <212> DNA
    <213> Homo sapien

    <220>
    <221> misc_feature
    <222> (1)...(451)
    <223> n = A,T,C or G

    <400> 110
ggtcgcggcc gaggtctggg gaaggggtga gaatccctgg gccttgccca gtcctgagct      60
ctgggtgtct gcagggaagc acagtggtga gttagtgtta aagaaagcat ccagagaggt     120
```

32

```
aagaggggct tgggtagcac cctttgcctc tgtcacttcc gcaaaaactt cttgttgagg       180
aggaagatga gaaggttgac attgactttg gccttgttga agagtttcat gacagccaca       240
ccctcatact ggagctgcan gagatcctga tagtgaagct tgaaatcgct ccatgtccac       300
acccaggaac ttggcattta cttcaaactt tcctgcctca tctcccggcg tgatgtcaaa       360
natgacgttt cttgaagtga gaggcgggaa agatcttcaa tttccaccaa agacacccct       420
tttccaggaa gcttgagcaa caagtgtaat g                                       451
```

        <210> 111
        <211> 407
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(407)
        <223> n = A,T,C or G

        <400> 111
```
ggccgacgtt cgacctgact tctttngagc agntgncact acccgtcttg aggaatgccg        60
actgcagaca gtggcccang gcaaagagtg tgcgtcatcg atganattgg naagatggag       120
ctcttcagtc agnttttcat tcaagctgnt cgtcagacgc tgtctacccc agggactata       180
atcctnggca caatcccagt tcctanagga aagccactgn ctcttgtaga agaaatcana       240
cacanaaagg atgtgaacng tgtttaatgt caccaaggga aaacatgaaa ccaccttctg       300
ccagatatcg ggacgttgcg tgcagatcaa gcacgnaagt gaagacgcgt gcattccttg       360
ccttccgtga acgantgccc agntcaagaa gancctgatg gaaccct                     407
```

        <210> 112
        <211> 401
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(401)
        <223> n = A,T,C or G

        <400> 112
```
tcgcggccga ggtcggccga ggtctgacat ctgttgtctg tgataaccac ttctgtattg        60
cgtcttaacc acttctgtat tgtgtggttt taactgccta aggcggcaat gggcagtggg       120
cccctttccc ttaggatggg tatcaattca acaatattta taggcattt actgtgtgct        180
aagcatttgg aagacccagg ctacaaaata agacatagtt cctgccctcc aggccagcag       240
agggaggcac aaatacccag gaatctctga tgggtgtgaa gtgcggtcgt gggccacaga       300
aaatgaccgt catggagacc ctgctaaagg tcggaccctg agcccaaagg ggtattcaga       360
agnggagatg attttggccc cactcataga tgggtggcaa a                           401
```

        <210> 113
        <211> 451
        <212> DNA
        <213> Homo sapien

        <400> 113
```
gtcgcggccg aggtccatat taaaaagtcc atcataaaca aagactcctc ctcatggtat        60
gaatatgctc catatgccca taatggtgca taacggactt agaaattcca atgagtctta       120
gggttgaaat ttccaatgac ctgagcaagg cagctcccta tagcttctgg ataacatttt       180
acacccagag ttcaggctta aacagaccta tcaacacaat tattttcgga ttgtctgtct       240
```

```
agaaaacggc aatgctcaaa ggaatataaa taagggtggg gggacatatg cttccagcct    300
ggcctttctc catgtggtaa aaaacaatgg aatggctgtg ttaatttttt tttaatcttt    360
tctgaccttt actatgtttg gtaatggaaa taagtcaggg aaaacaaaat gaacaggtct    420
catcacttaa ttaatactgg gttttcttct t                                   451
```

```
        <210> 114
        <211> 441
        <212> DNA
        <213> Homo sapien


        <400> 114
ggccgcccgg gcaggtccat cctgtcagag atgggagaag tcacagacgg aatgatggat     60
acaaagatgg ttcactttct tacacactat gctgacaaga ttgaatctgt tcatttttca    120
gaccagttct ctggtccaaa aattatgcaa gaggaaggtc agcctttaaa gctacctgac    180
actaagagga cactgttgtt tacatttaat gtgcctggct caggtaacac ttacccaaag    240
gatatggagg cactgctacc cctgatgaac atggtgattt attctattga taaagccaaa    300
aagttccgac tcaacagaga aggcaaacaa aaagcagata agaaccgtgc ccgagtagaa    360
gagaacttct tgaaacttga cacatgtgca aagacaggaa gcagcacagt ctcggcggga    420
ggaagaaaaa aagaacagag a                                              441
```

```
        <210> 115
        <211> 431
        <212> DNA
        <213> Homo sapien


        <220>
        <221> misc_feature
        <222> (1)...(431)
        <223> n = A,T,C or G


        <400> 115
gccgcccggg caggtccatt ggcggtgaca aaaggaaaag aagcaaagag actcagtcca     60
taatgctgat tagttagaag aaagggctag gattgagaaa gtaccaggaa cttttaatta    120
tttaaaagag aatgctgact gttaatgttt taaatcttac tgttcaaatg tactaatatg    180
aatttttacc ctttgtgcat gaatattcta aacaactaga agacctccac aatttagcag    240
ttatgaaagt taaacttttt attataaaaa ttctaaacct tactgctcct ttaccaggaa    300
catgacacac tatttancat cagttgcata cctcgccaat agtataattc aactgtcttg    360
cccgaacaat catctccatc tggaagacgt aagcctttag aaacacattt ttctattaat    420
ttctctagaa c                                                         431
```

```
        <210> 116
        <211> 421
        <212> DNA
        <213> Homo sapien


        <400> 116
gtcgcggccg aggtccagaa atgaagaaga agtttgcaga tgtatttgca aagaagacga     60
aggcagagtg gtgtcaaatc tttgacggca cagatgcctg tgtgactccg gttctgactt    120
ttgaggaggt tgttcatcat gatcacaaca aggaaccggg gctcgtttat caccagtgag    180
gagcaggacg tgagcccccg ccctgcacct ctgctgttaa acaccccagc catcccttct    240
ttcaaaaggg atcctttcat aggagaacac actgaggaga tacttgaaga atttggattc    300
agcccgcgaa gagatttatc aagcttaact cagataaaat cattgaaagt aataaggtaa    360
aagctaagtc tctaacttcc aggcccacgg ctcaagtgaa tttcgaatac tgcatttaca    420
g                                                                    421
```

34

```
        <210> 117
        <211> 489
        <212> DNA
        <213> Homo sapien

        <400> 117
agcgtggtcg cggccgaggt aaggctgcga ggttgtggtg tctgggaaac tccgaggaca       60
gagggctaaa tccatgaagt ttgtggatgg cctgatgatc cacagcggag accctgttaa      120
ctactacgtt gacactgctg tgcgccacgt gttgctcaga cagggtgtgc tgggcatcaa      180
ggtgaagatc atgctgccct gggacccaac tggtaagatt ggccctaaga agcccctgcc      240
tgaccacgtg agcattgtgg aacccaaaga tgagatactg cccaccaccc ccatctcaga      300
acagaagggt gggaagccag agccgcctgc catgccccag ccagtcccca cagcataaca      360
gggtctcctt ggcagacctg cccgggcggc cgctcgaaag cccgaattcc agcacactgg      420
cggccgttac tagtggatcc cagctcggta ccaagcttgg cgtaatcatg gtcatagctg      480
gtttcctgt                                                             489

        <210> 118
        <211> 489
        <212> DNA
        <213> Homo sapien

        <400> 118
tcgagcggcc gcccgggcag gtattgaata cagcaaaatt ctatatacaa agtgacctgg       60
acctgctgct tcaaaacatg atcctttctt actaatatct tgatagtcgg tccatagagc      120
attagaaagc aattgactct taaataaaca gaaaagtgcc taatgcacat taaatgaatg      180
gcctaactac tggaacttta gtagttctat aaggtgatta acataggtag gatccagttc      240
ctatgacagg ctgctgaaga acagatatga gcatcaagag gccattttgt gcactgccac      300
cgtgatgcca tcgtgtttct ggatcataat gttcccatta tctgattcta gacacaccac      360
aggaatatca gtggggtcag aggttagctt agctgcttgc tgggctagaa cagatatcac      420
tccagcatgc tcatctgaca gggtcccgcg gcaacccaga ttaagtcctt gtgaatctgt      480
gcacaggga                                                             489

        <210> 119
        <211> 181
        <212> DNA
        <213> Homo sapien

        <400> 119
taggttccag agacttttgg cccaggagga atatttactt ttagctctgg acatcattac       60
aaaaaggaat atttcccaaa cctcttcaga ccgagaatac atgggtaaaa ttattaaata      120
gttgtataat aaaaataatt ttttccttaa aaaaaaaaa aacctcggcc gcgaccacgc      180
t                                                                      181

        <210> 120
        <211> 489
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(489)
        <223> n = A,T,C or G

        <400> 120
gcgtggtcgc ggccgaggtc catttaaaac aaagaaaaat actaaagcca ctagtaaaca       60
```

```
tctgatgtgc aaaatacaac atcctctagt tggctttatg ccattattac ataagctcca        120
aatagctcat cttaaattaa aaagaaaaag tggctgtccc atctctgctg cataaatcag        180
attttttttt aaaggtttag agtactttaa ggaagggaag ttcaaaactg ccagtgaaat        240
tcacagagaa tacaaattta gcaatttaat ttcccaaagc tctttgaaga agcaagagag        300
tctctcttct taatgcagtg ttctcccaag aggaactgta attttgcttg gtacttatgc        360
tgggagatat gcaaaatgtg ttttcaatg tttgctagaa tataatggtt cctcttcagt        420
gnctggttca tcctggaact catgggttaa gaaggacttc ttggagccga actgcccggg        480
cgggccntt                                                                489
```

```
        <210> 121
        <211> 531
        <212> DNA
        <213> Homo sapien

        <400> 121
cgagcggccg cccgggcagg tggccagcgc tggtcccgca gacgccgaga tggaggaaat        .60
atttgatgat gcgtcacctg gaaagcaaaa ggaaatccaa gaaccagatc ctacctatga        120
agaaaaaatg caaactgacc gggcaaatag attcgagtat ttattaaagc agacagaact        180
ttttgcacat ttcattcaac ctgctgctca gaagactcca acttcacctt tgaagatgaa        240
accagggcgc ccacgaataa aaaaagatga gaagcagaac ttactatccg ttggcgatta        300
ccgacaccgt agaacagagc aagaggagga tgaagagcta ttaacagaaa gctccaaagc        360
aaccaatgtt tgcactcgat ttgaagactc tccatcgtat gtaaaatggg gtaaactgag        420
agattatcag gtcccgagga ttaaactggc tcatttcttt gtatgagaat ggcatcaatg        480
gtatccttgc agatgaaatg ggcctaggaa agactcttca acaatttctc t                531
```

```
        <210> 122
        <211> 174
        <212> DNA
        <213> Homo sapien

        <400> 122
tcgagcggcc gcccgggcag gtctgccaac agcagaggcg gggcctccgg catcttcaaa        60
gcacctctga gcaggctcca gccctctggc tgcgggaggg gtctgggtc tcctctgagc         120
tcggcagcaa agcagatgtt atttctctcc cgcgacctcg ccgcgacca cgct              174
```

```
        <210> 123
        <211> 531
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(531)
        <223> n = A,T,C or G

        <400> 123
agcgtggtcg cggccgaggt cctcaaccaa gagggttgat ggcctccagt caagaaactg        60
tggctcatgc cagcagagct ctctcctcgt ccagcaggcg ccatgcaagg gcaggctaaa        120
agacctccag tgcatcaaca tccatctagc anagagaaaa ggggcactga agcagctatg        180
tctgccaggg gctagggct ccccttgcaga cagcaatgct acaataaagg acacagaaat        240
ggggaggtg ggggaagccc tatttttata acaaagtcaa acagatctgt gccgttcatt         300
cccccagaca cacaagtaga aaaaaaccaa tgcttgtggt ttctgccaag atggaatatt        360
cctccttcct aanttccaca catggccgtt tgcaatgctc gacagcattg cactgggctg        420
cttgtctctg tggtctgggc accagtagct tgggccccat atacacttct cagttcccac        480
anggcttatg gccnangggc angctccaat tttcaagcac cacgaaggaa g                531
```

```
<210> 124
<211> 416
<212> DNA
<213> Homo sapien

<400> 124
tcgagcggcc gcccgggcag gtccatctat actttctaga gcagtaaatc tcataaattc       60
acttaccaag cccaggaata atgactttta aagccttgaa tatcaactaa gacaaattat      120
gccaattctg atttctcaca tatacttaga ttacacaaag ataaagcttt agatgtgatc      180
attgtttaat gtagacttat ctttaaagtt tttaattaaa aactacagaa gggagtaaac      240
agcaagccaa atgatttaac caaatgattt aagagtaaaa ctcactcaga aagcattata      300
cgtaactaaa tatacatgag catgattata tacatacatg aaactgcaat tttatggcat      360
tctaagtaac tcatttaagt acatttttgg catttaaaca aagatcaaat caagct         416


<210> 125
<211> 199
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(199)
<223> n = A,T,C or G

<400> 125
agcgtggtcg cggccgaggt gcttttttttt tttttttttt tttttttttt gctattctaa       60
aggggaaggc cccttttttat taaacttgta cattttactt tccttctttc anaatgctaa      120
taaaaaactt ttgtttatac ttaaaaaaac cataaatcan acaaacaaaa gaaacgattc      180
caacatcact tctgngatg                                                  199


<210> 126
<211> 490
<212> DNA
<213> Homo sapien

<400> 126
cgtggtcgcg gccgaggtcc agttgctcta agtggattgg atatggttgg agtggcacag       60
actggatctg ggaaaacatt gtcttatttg cttcctgcca ttgtccacat caatcatcag      120
ccattcctag agagaggcga tgggcctatt tgtttggtgc tggcaccaac tcgggaactg      180
gcccaacagg tgcagcaagt agctgctgaa tattgtagag catgtcgctt gaagtctact      240
tgtatctacg gtggtgctcc taagggacca caaatacgtg atttggagag aggtgtggaa      300
atctgtattg caacacctgg aagactgatt gactttttag agtgtggaaa aaccaatctg      360
agaagaacaa cctaccttgt ccttgatgaa gcagatagaa tgcttgatat gggctttgaa      420
ccccaaataa ggaagattgt ggatcaaata agacctgata ggcaaactct aatgtggagt      480
gcgacttggc                                                            490


<210> 127
<211> 490
<212> DNA
<213> Homo sapien

<400> 127
cgtggtcgcg gccgaggtcg gccgaggtct ggagatctga gaacgggcag actgcctcct       60
caagtgggtc cctgacccct gaccccgag cagcctaact gggaggcacc ccccagcagg       120
```

```
ggcacactga cacctcacac ggcagggtat tccaacagac ctgaagctga gggtcctgtc    180
tgttagaagg aaaactaaca agcagaaagg acagccacat caaaaaccca tctgtacatc    240
accatcatca aagaccaaaa gtaaataaaa ccacaaagat gggaaaaaaa cagaacagaa    300
aaactggaaa ctctaaaaag cagagcacct ctcctcttcc aaaggaacgc agttcctcac    360
cagcaatgga acaaagctgg atggagaatg actttgacga gctgagaaaa gaacgcttca    420
gacgatcaaa ttactctgag ctacgggagg acattcaaac caaaggcaaa gaagttgaaa    480
actttgaaaa                                                           490
```

```
          <210> 128
          <211> 469
          <212> DNA
          <213> Homo sapien

          <220>
          <221> misc_feature
          <222> (1)...(469)
          <223> n = A,T,C or G

          <400> 128
cgtggtcgcg gccgaggtgc tttttttttt tttttttttt tttttttttt tgctgattta    60
tttttctnt ttattgttac atacaatgta taaacacata aaacanaaaa cagtagggat    120
cctctaggat ctctagggan acagtaaagt anaaagaggt ctcanaaaca tttttttaaa    180
gtacaagaca ttcagngctc ggcccaaagg cgtaaaaggt ttanagccag canatagctg    240
nactaaaggc tccgtctntn tccccanagc caggacaacc ccagggagct ntccattagc    300
agccagtcca cgcaggcagg atgctgcgga aaaagctcta tgctganaac attccccttg    360
atggaaagaa gggcaacaca aaaggggtaa ctaanagctc cttcctctcg tgaggcgac     420
aactgaggaa cagaaaagga gtgtcccatg tcacttttga ccccctccc                469
```

```
          <210> 129
          <211> 419
          <212> DNA
          <213> Homo sapien

          <400> 129
gcgtggtcgc ggccgaggtc tgattttcat ttaaatattt cagagctata gcatttgcct    60
ccatgctcaa atccacacca ttggggctta agccgctcat gccaacatta gcaaatgaca    120
tgcagtttaa tccagagatc actgcttctg ggctgatgca tgccaacaca ctggcgtgat    180
ccacgttatg tgcatttttc ttcactttag tgggagaatc aatttttact ccaaggcttc    240
ttagttgctt aagagttgca ttaaggacac aatctttgtc caccagtctt gaatgatgtg    300
tttttttctt tgtatggtaa acgttttggg ttctggtgca ttcatgactg ataattactg    360
ctttggtaga cggctgctca agtttccttg gaggaactat ttaataggtg ggttacttg     419
```

```
          <210> 130
          <211> 354
          <212> DNA
          <213> Homo sapien

          <400> 130
agcgtggtcg cggccgaggt ccatctgagg agataaccac atcactaaca aagtgggagt    60
gaccccgcag agcacgctgt ggaattccat agttggtctc atccctggtc agtttccaca    120
tgatgatggt cttatctcga gaggcggaga ggatcatgtc cgggaactgc ggggtagtag    180
cgatctgggt tacccagccg ttgtggccct tgagggtgcc acgaagggtc atctgctcag    240
tcatggcggc ggcgagagcg tgtgtcgctg cagcgacgag gatggcactg gatggcttag    300
agaaactagc accacaacct ctcctgccgc acctgcccgg cggcccgct cgaa           354
```

38

```
<210> 131
<211> 474
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(474)
<223> n = A,T,C or G

<400> 131
cgagcggccg cccgggcagg tctggcagca gcttcctctg gaataattga cagctttgtg      60
ctgcctgact aaaatttgaa atgacaaccg ctgaatgtaa aatgatgtac ctacaatgag     120
agagatttag gaatactatc tgtcaatcca tagatgtaga aacaaaacaa actacagaat     180
gaaaacaaac ttattttaaa ccaaagaaac aaatgtatcc aaaatatagt ccatgatata     240
tttgattact agtataacca cagttgaaaa cttaaaaaaa aaaattgaca ttttttgtaa     300
tgggtactaa tggatttata aaaggtttct gtttccaaag atgttattgg ggtccacata     360
ttccttgaag acttcagcat cccaaagccc gacatcagag atactttcct ttagccattg     420
nttcccgtaa cttgcccact ccatggtgat gtgacaggct tcccttcatt agca           474


<210> 132
<211> 474
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(474)
<223> n = A,T,C or G

<400> 132
ggccgaggtg gggaattcat gtggaggtca gagtggaagc aggtgtgaga gggtccagca      60
gaaggaaaca tggctgccaa agtgtttgag tccattggca agtttggcct ggccttagct     120
gttgcaggag gcgtggtgaa ctctgcctta tataatgtgg atgctgggca cagagctgtc     180
atctttgacc gattccgtgg agtgcaggac attgtggtag gggaagggac tcattttctc     240
atcccgtggg tacagaaacc aattatcttt gactgccgtt ctcgaccacg taatgtgcca     300
gtcatcactg gtagcaaaga tttacagaat gtcaacatca cactgcgcat cctcttccgg     360
cctgtcgcca gccagcttcc tcgcatcttc accagcatcg ganaggacta tgatgaaccg     420
tgtgctgccg tccatcacaa ctgagatcct caagtcagtg gtggctcgct ttga           474


<210> 133
<211> 387
<212> DNA
<213> Homo sapien

<400> 133
tgctcgagcg gccgccagtg tgatggatat ctgcagaatt cggcttagcg tggtcgcggc      60
cgaggtctgc gggccccctta gcctgccctg cttccaagcg acggccatcc cagtagggga     120
ctttcccaca ctgtgccttt acgatcagcg tgacagagta gaagctggag tgcctcacca     180
cacggcccgg aaacagcggg aagtaactgg aaagagcttt aggacagctt agatgccgag     240
tgggcgaatg ccagaccaat gatacccaga gctacctgcc gccaacttgt tgagatgtgt     300
gtttgactgt gagagagtgt gtgtttgtgt gtgtgtttg ccatgaactg tggccccagt     360
gtatagtgtt tcagtggggg agaactg                                         387


<210> 134
```

```
        <211> 401
        <212> DNA
        <213> Homo sapien

        <400> 134
ggccgcccgg gcaggtctga tgaagaacac gggtgtgatc cttgccaatg acgccaatgc      60
tgagcggctc aagagtgttg tgggcaactt gcatcggctg ggagtcacca acaccattat     120
cagccactat gatgggcgcc agttccccaa ggtggtgggg ggctttgacc gagtactgct     180
ggatgctccc tgcagtggca ctggggtcat ctccaaggat ccagccgtga agactaacaa     240
ggatgagaag gacatcctgc gcttgtgctc acctccagaa ggaagttgct cctgagtgct     300
attgactctt gtcaatgcga ccttcaagac aggaggctac ctggtttact gcacctgttc     360
tatcacagtg agacctctgc catggcagaa caggggaagc t                        401


        <210> 135
        <211> 451
        <212> DNA
        <213> Homo sapien

        <400> 135
ggtcgcggcc gaggtctgtt cctgagaaca gcctgcattg gaatctacag agaggacaac      60
taatgtgagt gaggaagtga ctgtatgtgg actgtggaga aagtaagtca cgtgggccct     120
tgaggacctg gactgggtta ggaacagttg tactttcaga ggtgaggtgt cgagaaggga     180
aagtgaatgt ggtctggagt gtgtccttgg ccttggctcc acagggtgtg ctttcctctg     240
gggccgtcag ggagctcatc ccttgtgttc tgccagggtg gggtaccggg gtttgacact     300
gaggagggta acctgctggc tggagcggca gaacagtggc cttgatttgt cttttggaag     360
attttaaaaa ccaaaaagca taaacattct ggtccttcac aatgctttct ctgaagaaat     420
acttaacgga aggacttctc cattcaccat t                                   451


        <210> 136
        <211> 411
        <212> DNA
        <213> Homo sapien

        <400> 136
ggccgcccgg gcaggtctga atcacgtaga atttgaagat caagatgatg aagccagagt      60
tcagtatgag ggttttcgac ctgggatgta tgtccgcgtt gagattgaaa atgttccctg     120
tgaatttgtg cagaactttg accccctta ccccattatc ctgggtggct tgggcaacag     180
tgagggaaat gttggacatg tgcaggtggg tcctttgct gcgtatttgg tgcctgaggc     240
tctgtggatt tccctccat caatcatctt accctctcat ccccctcaga tgcgtctgaa     300
gaaacatctc tggtataaga aaatcctcaa gtcccaagat ccaatcatat tttctgtagg     360
gtggaggaag tttcagacca tcctgctcta ttatatccga agaccacaat g             411


        <210> 137
        <211> 211
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(211)
        <223> n = A,T,C or G

        <400> 137
cggccgcccg gcaggtcgg ttggtgcggc ctccattgtt cgtgttttaa ggcgccatga      60
ggggtgacag aggccgtggt cgtggtgggc gctttggttc cagaggaggc ccaggaggag     120
```

```
ggttcaggcc ctttgcacca catatcccat ttgacttcta tttgtgtgaa atggcctttc    180
cccggntcaa gccagcacct cgatgaaact t                                    211
```

        <210> 138
        <211> 471
        <212> DNA
        <213> Homo sapien

        <400> 138
```
gccgcccggg caggtctggg ctggcgactg gcatccaggc cgtaactgca aatctatgct     60
aggcggggtc tcccttctgt gtgttcaagt gttctcgact tggattctta actattttaa    120
aaaatgcact gagtttgggt taaaaaccaa ccaccaaaat ggatttcaac acagctctaa    180
agccaagggc gtggccggct ctcccaacac agcgactcct ggaggccagg tgcccatggg    240
cctacatccc ctctcagcac tgaacagtga gttgattttt cttttttacaa taaaaaaagc   300.
tgagtaatat tgcataggag taccaagaaa ctgcctcatt ggaaacaaaa actatttaca    360
ttaaataaaa agcctggccg caggctgcgt ctgccacatt tacagcacgg tgcgatgcac    420
acggtgacca aaccacggag gcaagcttct ggcactcaca ccacgacccg c             471
```

        <210> 139
        <211> 481
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(481)
        <223> n = A,T,C or G

        <400> 139
```
gtcgcggccg aggtctgttc tttagctcag atttaaacct gctgtctctt ctttatttgc     60
agaatgaatt cccagttcct gagcagttca agaccctatg gaacgggcag aagttggtca    120
ccacagtgac agaaattgct ggataagcga agtgccactg ggttctttgc cctcccttca    180
caccatggga taaatctgta tcaagacggt tcttttctag atttcctcta ccttttttgct   240
cttaaaactg cttctctgct ctgagaagca cagctacctg ccttcactga aatatacctc    300
aggctgaaat ttggggtggg atagcaggtc agttgatctt ctgcaggaag gtgcagcttt    360
tccatatcag ctcaaccacg ccgncagtcc attcttaagg aactgccgac taggactgat    420
gatgcatttt agcttttgag cttttggggg gtattctacc aaccaacagt ccatttggaa    480
a                                                                     481
```

        <210> 140
        <211> 421
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(421)
        <223> n = A,T,C or G

        <400> 140
```
gtcgcggccg aggtttccca tttaagaaaa atagatcttg agattctgat tcttttccaa     60
acagtcccct gctttcatgt acagcttttt ctttacctta cccaaaattc tggccttgaa    120
gcagttttcc tctatggctt tgcctttctg attttctcag aggctcgagt ctttaatata    180
accccaaatg aaagaaccaa ggggagggggt gggatggcac tttttttttgt tggtcttgtt   240
ttgttttgtt ttttggttgg ttgggttccg ttattttta agattagcca ttctctgctg     300
```

41

```
ctatttccct acataatgtc aattttttaac cataattttg acatgattga gatgtacttg      360
aggctttttt gntttaattg agaaaagact ttgcaatttt tttttttagga tgagcctctc      420
c                                                                       421
```

```
        <210> 141
        <211> 242
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(242)
        <223> n = A,T,C or G

        <400> 141
cgantngccc gcccgggcan gtctgtctaa ntttntcang gaccacgaac agaaactcgt       60
gcttcaccga anaacaatat cttaaacatc gaanaattta aatattatga aaaaaaacat      120
tgcaaaatat aaaataaata nnaaaaggaa aggaaacttt gaaccttatg taccgagcaa      180
atccaggtct agcaaacagt gctagtccta nattacttga tntacaacaa cacatgaata      240
ca                                                                     242
```

```
        <210> 142
        <211> 551
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(551)
        <223> n = A,T,C or G

        <400> 142
agcgtggtcg cggcncgang tccacagggc anatattctt ttagtgtctg gaattaaaat       60
gtttgaggtt tangtttgcc attgtctttc caaaaggcca aataattcan atgtaaccac      120
accaagtgca aacctgtgct ttctatttca cgtactgttg tccatacagt tctaaataca      180
tgtgcagggg attgtagcta atgcattaca cagtcgttca gtcttctctg cagacacact      240
aagtgatcat accaacgtgt tatacactca actagaanat aataagcttt aatctgaggg      300
caagtacagt cctgacaaaa gggcaagttt gcataataga tcttcgatca attctctctc      360
caaggggccc gcaactaggc tattattcat aaaacacaac tgaanagggg attggtttta      420
ctggtaaatc atgtgntgct aaatcatttt ctgaacagtg gggtctaaat cantcattga      480
tttagtggca gccacctgcc cggcggccgn tcgaagccca attctgcaga tatccatcac      540
actggcggcc g                                                           551
```

```
        <210> 143
        <211> 515
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(515)
        <223> n = A,T,C or G

        <400> 143
cgagnggccc gcccgggcag gtatcttcac aaactcaaca aaggcactac atgagacttc       60
```

42

```
acattcccct agtccaatag ctgacaaatt tttgcaacgt tctgcaatgc gaattaactc      120
ttcatcaagt ggccgtaatc catttgcaca cactactagt tcaaccagtc tagggcatgt      180
cattcccaca cggccaagca catctttgct tactgatctc ccaaagtaca gatgggtggc      240
aggtatttca tagcgaaaga aggggtcaaa ttcttcttca tataanaaaa aatacatcac      300
taagttcact ttgggtgaat gtctgatgaa agcatcccag ctactcttct gaatagtatg      360
gaagtgtgtc tgtccaggat tctcactgac tacatcaatg cgcaaatgtt ctaatcgaac      420
atgtttttca gaagacaatg caagtaacaa ctcatcactc aataagtggt aagttcaggg      480
ctagttctct taagccgnga cactgatcag cacac                                 515
```

```
        <210> 144
        <211> 247
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(247)
        <223> n = A,T,C or G

        <400> 144
tgcattctct ntggatgcan acctgcccgt tggtagggac tntgctcaca cggaacatgg       60
acggttacac ctgtgccgtg ggtgacgtcc accagcttct ggatcatctc ggcgngggtg      120
ttgtggaagg gcagactatc cacctccatg cncacgatgc ccganacgcc actccggact      180
ntgtgctgca ccaanatgcc cagcattnta tcttcaagca nagcacttat cagggtcctt      240
ggcacac                                                                247
```

```
        <210> 145
        <211> 309
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(309)
        <223> n = A,T,C or G

        <400> 145
cgtgggtcgc ggcccgangt ctgctgtaac aaaacaccat agtctgggca gctcatagac       60
aatggaattt tatttctcac gcttctggag gctggattcc aagatcaagg ttccaggaga      120
ctcagtgtct ggcaaggtct cggtttctgc ctcanagatg gtgccatctg gctgtgtcct      180
cacaagtagg aaggtgcaag aagctcccct caggctctgt ctgtaagaca ctgatcccat      240
tcatganggg gaaacgtaat gacctaatca gcccccagag accccacttc taacaccatc      300
accttgggg                                                              309
```

```
        <210> 146
        <211> 486
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(486)
        <223> n = A,T,C or G

        <400> 146
```

43

```
agcgtgggtc gcggcncgac gtcctgtcca tatttcacag cccgagaact aatacaagat        60
gctgacatca tattttgtcc ctacaactat cttctanatg cacaaataag ggaaagtatg       120
gatttaaatc tgaaagaaca ggttgtcatt ttanatgaag ctcataacat cgaggactgt       180
gctcgggaat cagcaagtta cagtgtaaca gaagttcagc ttcggtttgc tcgggatgaa       240
ctanatagta tggtcaacaa taatataagg aaganagatc atgaacccct acgagctgtg       300
tgctgtagcc tcattaattg gntagaagca aacgctgaat atcttgnana angagantat       360
gaatcagctt gtaaaatatg gagtggaaat gaaatgctct taactttaca caaaatgggt       420
atcaccactg ctacttttcc cattttgcng gtaagatatn ttttctacct gngaaacgta       480
tttaag                                                                  486
```

```
        <210> 147
        <211> 430
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(430)
        <223> n = A,T,C or G

        <400> 147
gccgcccggg cangttcgac attacntnga gttccatgat gtacaattct ttcacgaaaa        60
acaatgaatg caagaatttg aggatctcct tactcctccc ttttacagat ggtctctcaa       120
tcccttcttc ttcctcttca tcttcatctt cttctgaacg cgctgccggg taccacggct       180
ttctttgtct ttatcgtgag atgaaggtga tgcttctgtt tcttctacca taactgaaga       240
aatttcgctg caagtctctt gactggctgt ttctccgact tcgcctttnt gtcaaacgng       300
agtcttttta cctcatgccc ctcagcttca cagcatcttc atctggatgt tnatttctca       360
aagggctcac tgaggaaact tctgattcan atgtcgaana gcactgtgaa gttttctctt       420
cattttgctg                                                              430
```

```
        <210> 148
        <211> 483
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(483)
        <223> n = A,T,C or G

        <400> 148
cccgggcagg tctgtgttgn tttncaaccg gtgtcctccc cagcgtccag aananggaaa        60
tgtggagcgg gtgatgatga cccctcgctg tcctgtcacc tcctgcacag cttcgtatgt       120
gggtctggtc tgggaccacc cgtacaggtt gtgcacgttg tagtgctcca cggggggagct       180
gtccggcagg atctgctgac tctccatgca cagagtcttg ctgctcaggc ccttgtccct       240
agattccaaa tatggcatat agggtggggt tatttagcat ttcattgctg cagcccctga       300
cagatccatc cacaaaattt gatggctcat tcatatcaat ccacaatcca tcaaacttca       360
agctcttctc tggntctcga nggtttgcat agaactcttc tatctctttc ttccaccacg       420
canacctcgg ncgcgaccac gctaagccga attctgcana tatccatcac actggcggcc       480
gct                                                                     483
```

```
        <210> 149
        <211> 439
        <212> DNA
        <213> Homo sapien
```

44

```
        <220>
        <221> misc_feature
        <222> (1)...(439)
        <223> n = A,T,C or G

        <400> 149
ctttcacgaa nacaatgaat gcaagaattt gaggatctcc ttactcctcc cttttacaga        60
tggtctctca atcccttctt cttcctcttc atcttcatct tcttctgaac gcgctgccgg       120
gtaccacggc tttctttgtc tttatcgtga gatgaaggtg atgcttctgt ttcttctacc       180
ataactgaag aaatttcgct gcaagtctct tgactggctg tttctccgac ttcgcctttt       240
tgcaaacgtg agtcttttta cctcatgccc ctcagcttcc acagcatctt catctggatg       300
ttcatttctc aaagggctca ctgaggaaac ttctgactca catgtcgaag aagcactgng       360
agtttctctt catttgctgc aaanttgctc tttgctggct gngctctcag accacccatt       420
tggctgcatg ggggctgac                                                    439


        <210> 150
        <211> 578
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(578)
        <223> n = A,T,C or G

        <400> 150
ggcncgcccg ggcangtcca ctccactttt gagctctgag ggaatacctt caggagggac        60
agggtcaggg agtcctggca gctccgcagc agagattcac attcattcag agacttgttg       120
tccagtgcaa tgccattgat cgcaacgatc ctgtctccca cagcaaggga cccttctta        180
gcggcagggc ttccaggcag cacagcggca gcatacactc cattctccag actgatgcca       240
ctgtctttct gtccactgan gttgatgtgc agcggcgtga ccaccttccc acccagggac       300
ttcctccgcc gcacgaccat gttgatgggc ccctncccca ttgaggagcg ccttgatggc       360
ctgcttcttg nccttggtga tgaagtccac atcggtgatt ctcacagcca gtcattgacc       420
cttaagcggn catcagcaat gcttcctttg gccactttag ngacaaatat gccacagtcc       480
ccgggaaaca agggtcattc acaccttctg gcatatcaaa cacctcggcc gggancacta       540
agccgaattc tgcagatatc catcacactg gngggccg                               578


        <210> 151
        <211> 503
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(503)
        <223> n = A,T,C or G

        <400> 151
cgagcggccc gcccggcag gtctgggaga tcagcgactg ctgccacgtg cccagaaatg        60
gctcgtcctt tcactacagc ggaatgcaat gagggtgggt gagaagatga tgggtcggtt       120
atttcattcc tttttctttt acaacttcac tttcagagac ttcagcgttc catgtctgct       180
gtgctgtgga acccagagtg ctcttgcctg gatggctgag aatcccttgg accctggaag       240
cacctactcc atgatggccc ggtatagtgc aggctcaata taatcttccc ggtatcttga       300
gttgataact cgttgccgtt tctttcttg cttaacctct ttctctgtga aaatctcatt       360
```

45

```
gaagcgcatg tctgaagcta ctgacagtct anatttgact ctcttgggaa gctcttcatc     420
cagtgtgtat acatcatctc tcttaaccac aagttggagc catncttaaa cttcacctgg     480
tacatttgga tagggtggga ggc                                              503
```

        <210> 152
        <211> 553
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(553)
        <223> n = A,T,C or G

        <400> 152
```
agcgtggtcg cggcccgagg tccactgagc tccgccttcc ccgggctccc tgaggaagca      60
gagtcctgac ttccaggaag gacaggacac agaggcaaga actcagcctg tgaggctctg     120
ggtggctcct gaggccagag gacgccttcc gcgatccatg gctcagcatc gtccttctgg     180
cttcccagcc ccgggccgaa cgttcgggtt aataagcaga gcagttattc ggctcctggc     240
aggagctccc ccgttagttt ccacgttgtg agcacattca tacttaagac tgnttctctt     300
tgtgttttaa gcgtctgtct ctgtagtaaa ctgaaatgtt aacagaaatg cagacctgcc     360
cgggcggccg ctcgaaagcc gaattctgca gatatccatc acactggcgg ccgctcgagc     420
atgcatctag anggcccaat tcgccctata gtgagtcgna ttacaattca ctgggccgcg     480
ntttacaacg tcgtgactgg gaaaaccctg cggtacccac ttaatcgcct tgcagnacat     540
cccccttttcg cca                                                        553
```

        <210> 153
        <211> 454
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(454)
        <223> n = A,T,C or G

        <400> 153
```
tcgagcggct cgcccgggca ggtccaccta gcatggctcc tctaaacacg caactcagcg      60
aggggacccc cttcacctct ggcaagagag ctgggtagat cagaaacttg gtgacacctg     120
gctagcacag agcaggctca cttgtcttgg tcccactacc cagattcctg cagacattgc     180
aaaccaaatg aaggttgntg aatgacccct gtccccagcc acttgttttg gtatcatctg     240
ctctgcagtg gaatgcctgt gtgtttgagt tcactctgca tctgtatatt tgagtataga     300
aaccgantca agtgatctgt gcatncagac acactggggc acctgancac agaacaaatc     360
accttaacga tctggaatga aactgnganc antgcccgcc tgggtgggtc tgganaaact     420
gccgncttct tgttggacct tggccgcacc acct                                 454
```

        <210> 154
        <211> 596
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(596)
        <223> n = A,T,C or G

46

```
      <400> 154
agcgtggtcg cggcccgang gcggcctcct gantganggg aagggacgtg ggggcggcca      60
cggcaggatt aacctccatt tcagctaatc atgggagaga ttaaagtctc tcctgattat     120
aactggttta naggtacagt tccccttaaa aagattattg tggatgatga tgacagtaag     180
atatggtcgc tctatgacgc gggcccccga agtatcaggt gtcctctcat attcctgccc     240
cctgtcagtg gaactgcaga tgtctttttc cggcagattt tggctctgac tggatggggt     300
taccgggtta tcgctttgca gtatccagtt tattgggacc atctcgagtt cttgtgatgg     360
attcacaaaa cttttanacc atttacaatt ggataaagtt catcttcttg gcgcttcttt     420
gggangcttt ttggcccana aatttgctga atacactcac aaatctccta gaagccattc     480
cctaatcctc tgcaattcct tcagngacac ctctatcttc aaccaacttg gactggaaac     540
agctttggct gatgcctgca tttatgctca aaaaatagtt cttggaaatt ttcatc        596
```

```
      <210> 155
      <211> 343
      <212> DNA
      <213> Homo sapien

      <220>
      <221> misc_feature
      <222> (1)...(343)
      <223> n = A,T,C or G
```

```
      <400> 155
ctcganttgg cncgcccggg cangtctgcc tggttttttga ccgngcgagc tatttagnct      60
ctggctctgt ttccggagct caaggnaaaa atcttgaana actcgagcag cttctgtgga     120
tagccttggg tacacatact gccgagcata gccaatgtac tttctcaata gctggtgggg     180
aatgggatct attgtttctc caggaaccac ctttagtctt tctgataatg gcttctcaga     240
aactacttca agtacggaag tatttgaatc ttgactatnc atacgagcta ctgtggcact     300
gctaatgggn tctctgctnt ccagctctta ttgcaatcac atg                      343
```

```
      <210> 156
      <211> 556
      <212> DNA
      <213> Homo sapien

      <220>
      <221> misc_feature
      <222> (1)...(556)
      <223> n = A,T,C or G
```

```
      <400> 156
tcgagcggcc cgcccgggca ggtctggcac cacncagatc gattaactgg ctcatctgat      60
ctcgtggccc ccaccctgga actgacttag cacaaaagga cacctcaatt ccttatgatt     120
tcatctccga cccaaccaat caacaccctt gactcactgg ccttcccccct cccaccaaat     180
tatccttaaa aactctgatc cccgaatgct caggagatc gatttgagta ctaataagac      240
tccagtctcc tgcacaagca gctctgtgta ctcttcctct attgcaattc ctgtcttgat     300
aaatcggctc tgtgtaggcg gcggaagaag tgaacctgtt gggcggttac cacctctgtc     360
gtgtgtgaca gttgntttga atctctaatt gctcagtaca gatccacatg caggttaagt     420
aagaagcttt tgaagaaaat ggaaagtctt aagtgatggc ttccaagaaa tcaaacctac     480
attaattagg gaacaacgga ctttacgtat cacaaatgaa gagactgacn aagtaaatca     540
acttggcctt ttctta                                                     556
```

```
      <210> 157
      <211> 333
```

```
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(333)
<223> n = A,T,C or G

<400> 157
ggtccacaaa aatatatnaa ataagctgga tatataaaan caaacactta acatngncan      60
cattccttca gttattcaaa ctcactgata nctaacnggg agnagttggn attctggaag     120
acttcctaag ctaaaagtat atttacatat ttacaacaca ngtaaatata acngaagaac     180
tacttcaaat aangnngaaa ttccagaatt ctanagattt atagctatag ntnacaanta     240
tcaccaattg gtttgcaatc aanngnccag cactacttat gannaangtt taactannaa     300
accaaaaggg gagaaaacct ggnagggaaa nat                                  333


<210> 158
<211> 629
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(629)
<223> n = A,T,C or G

<400> 158
tcgagcggcc gcccgggcag gtctggtaca tttgtgcgag gtccggcact ctgttctcat      60
ccagtaagtg gtcgagccct ttctgcagaa ttgctgttaa atgttctcct aatagctgtt     120
tctccacaca agcaatcagt ggtttctgtg tgctgtggtc caagtaagtg attactctgt     180
ctccctcttc ttctaagcgt ttacttacat ggttaagata ttctggaacc tctctttcct     240
gcattaacct ttggccttcg gcagcatata agcaattagt ctcttccaaa aatttcagtt     300
caaatgaatc tttatacacc tgcaggtcag acagcatgcc caggnaggct ccgcaacagg     360
ctccggtcca cggcctcgcc gctcctctcg cgctcgatca gcagtaggat tccatcaatg     420
gttttactct gaaccatttt atcactaata atatgggttc taaacagttc taatcccata     480
tcccagatgg agggcagcgt ggagttctgc agcacatagg tgcggtccaa gaacaggaag     540
atgcttctga tcatgaatca tttgnctggc aatggtcctg ccagcacgtg gtaatctttc     600
ttttaaaaat aaacccttat ctaaacgtc                                       629


<210> 159
<211> 629
<212> DNA
<213> Homo sapien

<220>
<221> misc_feature
<222> (1)...(629)
<223> n = A,T,C or G

<400> 159
tcgagcggcc gcccgggcag gttctagagg ganaatctgg ctgatttggg aataaaatat      60
aatcgaatat tcaacaccat gaagataaat cttattttgg aaatctactg accttaatac     120
cccaagcttg ccctgaatac tttgattgga attggaatat atcaaaaaag gttagtattt     180
ttgttgtagt taggatacta aaaggatatt agttacccaa gagatccaat ttgttttct     240
gatgaatagt gttcagtaaa atgaagcagt cttaagagtg actaataatt tcaaagtgat     300
```

```
ttttcgtcta ttcttaatat tttttaatta tttatttta agagttttat accttgagca    360
gatacaatga tccgctttag tgagaggaca atttctgatt gattgttttc tcttcaggcc    420
atctcacctc ttcattctct tgttacattt gaagcagttg atataatggg tttatacttt    480
aaaagataga catggtgcca tgaagtttgg ggaagttggg tgaattatcc cattctagtt    540
acagangagc tttccttaaa tgccctttac ttctangttt ggtcaagaag tcattttctg    600
agtaaaagtt attttcatat atgttgggg                                      629
```

```
        <210> 160
        <211> 519
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(519)
        <223> n = A,T,C or G

        <400> 160
tcgagcggcg cgcccgggca ggtctgctgg gattaatgcc aagttnttca gccataaggt     60
agcgaaatct agcagaatcc agattacatc cacttccaat cacgcggtgt ttgggtaatc    120
cacttagttt ccagataaca tacgtaagaa tgtccactgg gttggaaacc acaattatga    180
tgcaatcagg actgtacttg acgatctgag gaataatgaa tttgaagaca ttaacatttc    240
tctgcaccag attgagccga ctctcccctt cttgctgacg gactcctgca gttaccacta    300
caatcttana attgggcggg tcacagaata atctttatct gccacaattt taggtgctga    360
agaaataagc tcccatgctg cagatccatc atttctnctt taagcttatc ttccaaaaca    420
tccacaagan caangttcat cagccagaga ctttcccaga atgctgatag nacacgccat    480
accaacttgt ccaacancca ctacagcgat cttattggt                          519
```

```
        <210> 161
        <211> 446
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(446)
        <223> n = A,T,C or G

        <400> 161
cgagnggccc gcccgggcag gtccagtaag cntttnacga tgatgggaaa ggttatgcaa     60
ggtcccagcg gtacaacgag ctgtttctac atcatttgta ttctgcatgg tacgtacaat    120
agcagacacc atctgaggag aacgcatgat agcgtgtctg gaagcttcct ttttagaaag    180
ctgatggacc ataactgcag ccttattaac caccacctgg tcctcgtcat ttagcagttt    240
tgtcagttca gggattgcac gtgtggcang ttctgcatca tcttgatagt taatcaagtt    300
tacaactggc atgtttcagc atctgcgatg ggctcagcaa acgctggaca ttantgggat    360
gagcagcatc aaactgtgta natgggatct gcatgccctc atctaatgtc tcagggaaca    420
tagcagctcg taccctctga gctcga                                        446
```

```
        <210> 162
        <211> 354
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
```

```
       <222> (1)...(354)
       <223> n = A,T,C or G

       <400> 162
agcgtngtcg cggcccgang tcctgggaag cctttnttgc tgagcctcac agcctctgtc       60
aggcggctgc ggatccagcg gtccaccagg ctctcatggc ctccgggctg ggaggngggt      120
gagggcacaa aacccttccc aaggccacga anggcaaact tggtggcatt ccanagcttg      180
ttgcanaagt ggcggnaacc cagtatccgg ttcacatcca ggntgatgtc acgaccctgg      240
gacatgtang cacataatcc aaaccggaga gcatcggtgc cacattcacg aatccccgct      300
gggaagtcag ctttctgccc ttctttggcc ttctccacct cgctgggatc cagg            354


       <210> 163
       <211> 258
       <212> DNA
       <213> Homo sapien

       <220>
       <221> misc_feature
       <222> (1)...(258)
       <223> n = A,T,C or G

       <400> 163
tttttcncca agtcctcttg ccgngggatc tngactgcaa tttaagacac ttctaattag       60
ttatacccag gccctgcaaa attgctgggt ttatataata tattcttgct gcacgaagat      120
ttattattct gttggatgat tctattttaa ttntatttat tctggccaaa aaagaacctt      180
ctccgctcgt caagagangc caatntgtct tgaaggacaa gagaaagatg ctaacacaca      240
ctttcttctt cttgagga                                                    258


       <210> 164
       <211> 282
       <212> DNA
       <213> Homo sapien

       <220>
       <221> misc_feature
       <222> (1)...(282)
       <223> n = A,T,C or G

       <400> 164
ggaacatatt acttttaaat tacttgggtc aatgaaacat ttaataaaaa catttgcttc       60
tctatataat acgtatgtat aaaataagcc ttttcanaaa ctctggttct cataatcctc      120
tataaatcan atgatctgac ttctaagagg aacaaattac agnaaggggt atacattnat      180
gaatactggt agtactagag ganngacgct aaaccactct actaccactt gcggaactct      240
cacagggtaa atgacaaagc caatgactga ctctaaaaac aa                         282


       <210> 165
       <211> 462
       <212> DNA
       <213> Homo sapien

       <220>
       <221> misc_feature
       <222> (1)...(462)
       <223> n = A,T,C or G
```

50

```
        <400> 165
 gcccgggcan gtcctgtaat cccagctact cangangctg agtcatgana atcgcctgaa        60
 tccgggaggt agaggccgca gcgagcaaag attaagccac tgcactccag tctgggtgac       120
 agagtgagaa tctgtctgtt gctcctctgg cattggtctg aaatgggttt gtagaacatg       180
 ccacagaagg accagcanca gcaacaaatg gatttgtgga angcgtagct ccaaatggag       240
 cangcacact tgatgaagca cgctgtgtct gtgcagangc aaccactggc actgttccaa       300
 aaacattgct gctagcatta cttgtggaag tatacgcatt actggaggtg gctgcanaac       360
 tgaaaacgct gtctagttct gccanagctg catacttgnc tgaanatgca cttgactgac       420
 tgggaactga accacanaac caacaggacc tttacctgtg ga                         462


        <210> 166
        <211> 365
        <212> DNA
        <213> Homo sapien


        <220>
        <221> misc_feature
        <222> (1)...(365)
        <223> n = A,T,C or G


        <400> 166
 cgtgggtcgc ggcncgangt ctgaaaccaa tccagaacta aacatcagca cacaaaaaat        60
 accaggatag atggaatcaa aagactctga agccaaaagg aggctaggga gagcaactga       120
 acttagcaag ctgaggactt cagtgtccat catccgatcc tgccctgtaa caacaggtct       180
 atatgataga gatattccat ctgagctgga ggccattatc cttagcaaac taacacagaa       240
 cagaaaacca aatacatgtt ctcatttaga agtaggagct aaatgatgag aactcaagga       300
 cacaaagaaa ggaacaacag acactggggc ctacttgagg gtggagggtg ggaggaggga       360
 gaaga                                                                  365


        <210> 167
        <211> 364
        <212> DNA
        <213> Homo sapien


        <220>
        <221> misc_feature
        <222> (1)...(364)
        <223> n = A,T,C or G


        <400> 167
 agcgtggtcg cggcgcgang tccagcccta gcttgcctgt gactccgcct tcactgggtg        60
 ctctctctaa aagttgctga ctctttactg tatctcccaa ttcccactcc attggttcca       120
 taaggggagg ggtgtctcac tcaacatggt gttcctggta ccaagaactg gctgacgaag       180
 ctgggtgccg tggctcatgc ctgtaatccc agcacttttg ggaggccaag aagggcggat       240
 cacctgaggt ctggagttca agatcagcct gaccaacatg atgaaaccaa gtctccacta       300
 aaaatataaa acaattagcc aggcatggtg gtgggtgcct gnaatcccag ctactgggga       360
 ngct                                                                   364


        <210> 168
        <211> 447
        <212> DNA
        <213> Homo sapien


        <220>
        <221> misc_feature
```

```
         <222> (1)...(447)
         <223> n = A,T,C or G

         <400> 168
cccgggcagg  tcaaaaccca  aaacctttca  ttttagccca  aaccagctca  tgattaggta      60
tacaaggata  acagaaccag  ttgtcaggac  gagcatttga  caagtaaaag  caattcttgc     120
aaagctgcag  ttcatccagc  tcatggcatg  tgtctttata  tagcatcctc  gcaatgtcag     180
cttgctcact  gtctgctcca  tagaaaatca  cggtattgtg  gagaagcaat  tgggcatcag     240
ctttgaactc  ttcataactt  cggtatttcc  cttcattcac  tttctcttga  atggtgggaa     300
cgtccacaga  cctcggccgc  gaccacgcta  agcccgaatt  ctgcagatat  ccatcacact     360
ggcggccgtt  cgagcatggc  atctagaagg  cccaattcgc  ctatagngag  tcgnattacc     420
aattcactgg  ccgtcgnttt  acaacgc                                           447


         <210> 169
         <211> 524
         <212> DNA
         <213> Homo sapien

         <220>
         <221> misc_feature
         <222> (1)...(524)
         <223> n = A,T,C or G

         <400> 169
cgantngcgc  gcccgggcag  gtctgagcag  cctttctgnn  tgctggacta  ttgggattgg      60
gttcatccaa  cagagactgt  atggatgtta  gaatggaaga  cacatcatag  gttggactcc     120
aacggttctg  aagtatgtcc  agacatatac  taccatctgc  atagactaag  aacaaagaag     180
taggtacatt  aaacgtaaca  agaccactaa  ggttttaaca  ttatagacaa  aacanaaata     240
gtcaaganta  ctttgctttt  gaagtttaaa  gattcctatg  ttgcttccca  gttaactgcc     300
taaaaagata  agncataacc  accactagtg  aaataatcan  gatgatcaga  gaatgtcana     360
tgtgatcagt  ataaaactgg  angatattna  gtgtcatcct  ttggaaaagg  ctgccctatn     420
atccaggaaa  tcanaaacat  tnttgaacag  ggnccctagc  tatccacaga  catgtgggaa     480
attcattccc  caaatngtag  gctggatccc  ctatctgaaa  taac                      524


         <210> 170
         <211> 332
         <212> DNA
         <213> Homo sapien

         <220>
         <221> misc_feature
         <222> (1)...(332)
         <223> n = A,T,C or G

         <400> 170
tcgancggcn  cgcccgggca  ggtgacaaac  ctgttattga  agatgttggt  tctgatgagg      60
aanaanatca  gaagggatgg  tgacaagaan  aanaanaaga  agattaagga  aaagtacatc     120
gatcaagaag  agctcaacaa  aacaaagccc  atctggacca  gaaatcccga  cgatattact     180
aatgangagt  acggagaatt  ctataanagc  ttgaccaatg  actgggaaga  tcacttggca     240
gtgaagcatt  tttcagttga  nggacagttg  gaattcagag  cccttctatn  tgtcccacga     300
cgtgctcctt  ttgatctgtt  tganancaga  aa                                    332


         <210> 171
         <211> 334
         <212> DNA
```

52

```
            <213> Homo sapien

            <220>
            <221> misc_feature
            <222> (1)...(334)
            <223> n = A,T,C or G

            <400> 171
cgagnggcnc gcccgggcag gtctgttgat agcgacttaa cagaaaagtc tagacaaaca        60
taagcataaa aaattacagt ctttctaccc ttgggaatgg ggagaaaaag gaatctctac       120
cccaagacca gaaataataa gtcctgtttc tggtcctgaa catccagaat tatggaggct       180
ttggcctgac accacattan aatttggtct ggaaatcaaa ctttaganac angagatcgt       240
aagccatttt atactatcga cctaaattcc agtctaacgg ttcctttaca aagttgcgga       300
aagccctctt atatgctagc tgtaggaaat atag                                   334

            <210> 172
            <211> 439
            <212> DNA
            <213> Homo sapien

            <220>
            <221> misc_feature
            <222> (1)...(439)
            <223> n = A,T,C or G

            <400> 172
agcgtggtcg cggcccgang tctgcctata aaactagact tctgacgctg ggctccagct        60
tcattctcac aggtcatcat cctcatccgg gagagcagtt gtctgagcaa cctctaagtc       120
gtgctcatac tgtgctgcca aagctgggtc catgacaact tctggtgggg cgagagcagg       180
catggcaaca aattccaagt tagggtctcc aatgagcttc ctagcaagcc agaggaaggg       240
cttttcaaag ttgtagttac ttttggcaga aatgtcgtag tactgaagat tcttctttcg       300
gtggaagaca atggatttcg ccttcacttt ctgccttaat atccactttg gtgccacaca       360
acacaatggg gatgntttca cacacttngn accanatctc tatgccagnt aggccatttt       420
ggaagnactt cganggtac                                                    439

            <210> 173
            <211> 599
            <212> DNA
            <213> Homo sapien

            <220>
            <221> misc_feature
            <222> (1)...(599)
            <223> n = A,T,C or G

            <400> 173
cgatnggccg cccgggcagg tcctgtaaaa naggaaattc agacatcgta cgactcgtaa        60
ttgaatgtgg agctgactgc aatattttgt caaagcacca gaatagtgcc ctgcactttg       120
cgaagcagtc taacaatgtg cttgtgtacg acttgctgaa gaaccattta gagacacttt       180
caagagtagc agaagagaca ataaaggatt actttgaagc tcgccttgct ctgctagaac       240
cagttttcc aatcgcatgt catcgactct gtgagggtcc agatttttca acagatttca       300
attaccaacc cccacagaac ataccagaag gctctggcat cctgctgttt atcttccatg       360
caaacttttt gggtaaagaa gttattgctc ggctctgtgg accgtgtagt gtacaagctg       420
tagttctgaa tgataaattt cagcttcctg tttttctggg tctcgctctg ttgtccaggc       480
tggagtgcag tggcgcggat tacagctcac tggagtcttg acttcccagg cacaagcaat       540
```

```
cctcccacct cagcctccta actacctggg actaaaaatg caccgccacc acattccgg      599
```

```
        <210> 174
        <211> 458
        <212> DNA
        <213> Homo sapien

        <220>
        <221> misc_feature
        <222> (1)...(458)
        <223> n = A,T,C or G

        <400> 174
tcgatttggc cgcccgggca ggtccatgcn gnttntgccc attcccatgg ngcccgacaa       60
ncccatcccc gaggccgaca tccccatgtt catgttcatg cccaccatgc cctggctcat      120
ccctgcgctg ttccccagag gggccattcc catggtgccc gtcattacac cgggcatgtt      180
cataggcatg ggtcccccca ggagagggtt agnttgaggc cggacaggaa gcatgtttga      240
tggagaactg aggttcacag nctccaaaac tttgagtcat cacattcata ggctgctgca      300
tattctgtct gctgaatcca ttgtatncag tgatggcctg ctgggntttt ggaaggctng      360
cataccaggt agtaagntcg tctaggctga tgtttacacc tggggtcaga ccaagtanga      420
gggcaaggtt ttgctgactg attttctgga cccatatc                             458
```

```
        <210> 175
        <211> 1206
        <212> DNA
        <213> Homo sapien

        <400> 175
ggcacgagga agttttgtgt actgaaaaag aaactgtcag aagcaaaaga aataaaatca       60
cagttagaga accaaaaagt taaatgggaa caagagctct gcagtgtgag gtttctcaca      120
ctcatgaaaa tgaaaattat ctcttacatg aaaattgcat gttgaaaaag gaaattgcca      180
tgctaaaact ggaaatagcc acactgaaac accaatacca ggaaaaggaa aataaatact      240
ttgaggacat taagatttta aaagaaaaga atgctgaact tcagatgacc ctaaaactga      300
aagaggaatc attaactaaa agggcatctc aatatagtgg gcagcttaaa gttctgatag      360
ctgagaacac aatgctcact tctaaattga aggaaaaaca agacaaagaa atactagagg      420
cagaaattga atcacaccat cctagactgg cttctgctgt acaagaccat gatcaaattg      480
tgacatcaag aaaaagtcaa gaacctgctt ccacattgc aggagatgct tgtttgcaaa       540
gaaaaatgaa tgttgatgtg agtagtacga tatataacaa tgaggtgctc catcaaccac      600
tttctgaagc tcaaaggaaa tccaaaagcc taaaaattaa tctcaattat gccggagatg      660
ctctaagaga aaatacattg gtttcagaac atgcacaaag agaccaacgt gaaacacagt      720
gtcaaatgaa ggaagctgaa cacatgtatc aaaacgaaca agataatgtg aacaaacaca      780
ctgaacagca ggagtctcta gatcagaaat tatttcaact acaaagcaaa aatatgtggc      840
ttcaacagca attagttcat gcacataaga aagctgacaa caaaagcaag ataacaattg      900
atattcattt tcttgagagg aaaatgcaac atcatctcct aaaagagaaa aatgaggaga      960
tatttaatta caataaccat ttaaaaaacc gtatatatca atatgaaaaa gagaaagcag     1020
aaacagaagt tatataatag tataacactg ccaaggagcg gattatctca tcttcatcct     1080
gtaattccag tgtttgtcac gtggttgttg aataaatgaa taaagaatga gaaaaccaga     1140
agctctgata cataatcata atgataatta tttcaatgca caactacggg tggtgctgct     1200
cgtgcc                                                               1206
```

```
        <210> 176
        <211> 317
        <212> PRT
        <213> Homo sapien
```

54

```
        <400> 176
Met Gly Thr Arg Ala Leu Gln Cys Glu Val Ser His Thr His Glu Asn
1               5                   10                  15
Glu Asn Tyr Leu Leu His Glu Asn Cys Met Leu Lys Lys Glu Ile Ala
            20                  25                  30
Met Leu Lys Leu Glu Ile Ala Thr Leu Lys His Gln Tyr Gln Glu Lys
        35                  40                  45
Glu Asn Lys Tyr Phe Glu Asp Ile Lys Ile Leu Lys Glu Lys Asn Ala
    50                  55                  60
Glu Leu Gln Met Thr Leu Lys Leu Lys Glu Glu Ser Leu Thr Lys Arg
65                  70                  75                  80
Ala Ser Gln Tyr Ser Gly Gln Leu Lys Val Leu Ile Ala Glu Asn Thr
            85                  90                  95
Met Leu Thr Ser Lys Leu Lys Glu Lys Gln Asp Lys Glu Ile Leu Glu
            100                 105                 110
Ala Glu Ile Glu Ser His His Pro Arg Leu Ala Ser Ala Val Gln Asp
        115                 120                 125
His Asp Gln Ile Val Thr Ser Arg Lys Ser Gln Glu Pro Ala Phe His
    130                 135                 140
Ile Ala Gly Asp Ala Cys Leu Gln Arg Lys Met Asn Val Asp Val Ser
145                 150                 155                 160
Ser Thr Ile Tyr Asn Asn Glu Val Leu His Gln Pro Leu Ser Glu Ala
            165                 170                 175
Gln Arg Lys Ser Lys Ser Leu Lys Ile Asn Leu Asn Tyr Ala Gly Asp
            180                 185                 190
Ala Leu Arg Glu Asn Thr Leu Val Ser Glu His Ala Gln Arg Asp Gln
        195                 200                 205
Arg Glu Thr Gln Cys Gln Met Lys Glu Ala Glu His Met Tyr Gln Asn
    210                 215                 220
Glu Gln Asp Asn Val Asn Lys His Thr Glu Gln Gln Glu Ser Leu Asp
225                 230                 235                 240
Gln Lys Leu Phe Gln Leu Gln Ser Lys Asn Met Trp Leu Gln Gln Gln
            245                 250                 255
Leu Val His Ala His Lys Lys Ala Asp Asn Lys Ser Lys Ile Thr Ile
            260                 265                 270
Asp Ile His Phe Leu Glu Arg Lys Met Gln His His Leu Leu Lys Glu
        275                 280                 285
Lys Asn Glu Glu Ile Phe Asn Tyr Asn Asn His Leu Lys Asn Arg Ile
    290                 295                 300
Tyr Gln Tyr Glu Lys Glu Lys Ala Glu Thr Glu Val Ile
305                 310                 315
```

```
        <210> 177
        <211> 20
        <212> DNA
        <213> Artificial Sequence

        <220>
        <223> Made in the Lab

        <400> 177
ccaatcatct ccacaggagc                                              20

        <210> 178
        <211> 1665
```

```
      <212> DNA
      <213> Homo sapien

      <400> 178
gcaaacttttc aagcagagcc tcccgagaag ccatctgcct tcgagcctgc cattgaaatg      60
caaaagtctg ttccaaataa agccttggaa ttgaagaatg aacaaacatt gagagcagat     120
cagatgttcc cttcagaatc aaaacaaaag aaggttgaag aaaattcttg ggattctgag     180
agtctccgtg agactgtttc acagaaggat gtgtgtgtac ccaaggctac acatcaaaaa     240
gaaatggata aaataagtgg aaaattagaa gattcaacta gcctatcaaa aatcttggat     300
acagttcatt cttgtgaaag agcaagggaa cttcaaaaag atcactgtga acaacgtaca     360
ggaaaaatgg aacaaatgaa aaagaagttt tgtgtactga aaagaaact gtcagaagca     420
aaagaaataa aatcacagtt agagaaccaa aaagttaaat gggaacaaga gctctgcagt     480
gtgaggtttc tcacactcat gaaaatgaaa attatctctt acatgaaaat tgcatgttga     540
aaaaggaaat tgccatgcta aaactggaaa tagccacact gaaacaccaa taccaggaaa     600
aggaaaataa atactttgag gacattaaga tttaaaaga aaagaatgct gaacttcaga     660
tgaccctaaa actgaaagag gaatcattaa ctaaaagggc atctcaatat agtgggcagc     720
ttaaagttct gatagctgag aacacaatgc tcacttctaa attgaaggaa aaacaagaca     780
aagaaatact agaggcagaa attgaatcac accatcctag actggcttct gctgtacaag     840
accatgatca aattgtgaca tcaagaaaaa gtcaagaacc tgctttccac attgcaggag     900
atgcttgttt gcaaagaaaa atgaatgttg atgtgagtag tacgatatat aacaatgagg     960
tgctccatca accactttct gaagctcaaa ggaaatccaa aagcctaaaa attaatctca    1020
attatgccgg agatgctcta agagaaaata cattggtttc agaacatgca caaagagacc    1080
aacgtgaaac acagtgtcaa atgaaggaag ctgaacacat gtatcaaaac gaacaagata    1140
atgtgaacaa acacactgaa cagcaggagt ctctagatca gaaattattt caactacaaa    1200
gcaaaaatat gtggcttcaa cagcaattag ttcatgcaca taagaaagct gacaacaaaa    1260
gcaagataac aattgatatt cattttcttg agaggaaaat gcaacatcat ctcctaaaag    1320
agaaaatga ggagatattt aattacaata accatttaaa aaaccgtata tatcaatatg    1380
aaaaagagaa agcagaaaca gaaaactcat gagagacaag cagtaagaaa cttctttttgg    1440
agaaacaaca gaccagatct ttactcacaa ctcatgctag gaggccagtc ctagcattac    1500
cttatgttga aaatcttacc aatagtctgt gtcaacagaa tacttatttt agaagaaaaa    1560
ttcatgattt cttcctgaag cctgggcgac agagcgagac tctgtctcaa aaaaaaaaaa    1620
aaaaaaagaa agaaagaaat gcctgtgctt acttcgcttc ccagg                    1665
```

```
      <210> 179
      <211> 179
      <212> PRT
      <213> Homo sapien

      <400> 179
Ala Asn Phe Gln Ala Glu Pro Pro Glu Lys Pro Ser Ala Phe Glu Pro
1               5                   10                  15
Ala Ile Glu Met Gln Lys Ser Val Pro Asn Lys Ala Leu Glu Leu Lys
            20                  25                  30
Asn Glu Gln Thr Leu Arg Ala Asp Gln Met Phe Pro Ser Glu Ser Lys
        35                  40                  45
Gln Lys Lys Val Glu Glu Asn Ser Trp Asp Ser Glu Ser Leu Arg Glu
    50                  55                  60
Thr Val Ser Gln Lys Asp Val Cys Val Pro Lys Ala Thr His Gln Lys
65                  70                  75                  80
Glu Met Asp Lys Ile Ser Gly Lys Leu Glu Asp Ser Thr Ser Leu Ser
                85                  90                  95
Lys Ile Leu Asp Thr Val His Ser Cys Glu Arg Ala Arg Glu Leu Gln
            100                 105                 110
Lys Asp His Cys Glu Gln Arg Thr Gly Lys Met Glu Gln Met Lys Lys
        115                 120                 125
```

```
Lys Phe Cys Val Leu Lys Lys Lys Leu Ser Glu Ala Lys Glu Ile Lys
    130             135             140
Ser Gln Leu Glu Asn Gln Lys Val Lys Trp Glu Gln Glu Leu Cys Ser
145             150             155             160
Val Arg Phe Leu Thr Leu Met Lys Met Lys Ile Ile Ser Tyr Met Lys
            165             170             175
Ile Ala Cys
```

```
        <210> 180
        <211> 1681
        <212> DNA
        <213> Homo sapien

        <400> 180
gatacagtca ttcttgtgaa agagcaaggg aacttcaaaa agatcactgt gaacaacgta      60
caggaaaaat ggaacaaatg aaaaagaagt tttgtgtact gaaaaagaaa ctgtcagaag     120
caaaagaaat aaaatcacag ttagagaacc aaaaagttaa atgggaacaa gagctctgca     180
gtgtgagatt gactttaaac caagaagaag agaagagaag aaatgccgat atattaaatg     240
aaaaaattag ggaagaatta ggaagaatcg aagagcagca taggaaagag ttagaagtga     300
aacaacaact tgaacaggct ctcagaatac aagatataga attgaagagt gtagaaagta     360
atttgaatca ggtttctcac actcatgaaa atgaaaatta tctcttacat gaaaattgca     420
tgttgaaaaa ggaaattgcc atgctaaaac tggaaatagc cacactgaaa caccaatacc     480
aggaaaagga aaataaatac tttgaggaca ttaagatttt aaaagaaaag aatgctgaac     540
ttcagatgac cctaaaactg aaagaggaat cattaactaa aagggcatct caatatagtg     600
ggcagcttaa agttctgata gctgagaaca caatgctcac ttctaaattg aaggaaaaac     660
aagacaaaga aatactagag gcagaaattg aatcacacca tcctagactg gcttctgctg     720
tacaagacca tgatcaaatt gtgacatcaa gaaaaagtca agaacctgct ttccacattg     780
caggagatgc ttgtttgcaa agaaaaatga atgttgatgt gagtagtacg atatataaca     840
atgaggtgct ccatcaacca ctttctgaag ctcaaaggaa atccaaaagc ctaaaaatta     900
atctcaatta tgccggagat gctctaagag aaaatacatt ggtttcagaa catgcacaaa     960
gagaccaacg tgaaacacag tgtcaaatga aggaagctga acacatgtat caaaacgaac    1020
aagataatgt gaacaaacac actgaacagc aggagtctct agatcagaaa ttatttcaac    1080
tacaaagcaa aaatatgtgg cttcaacagc aattagttca tgcacataag aaagctgaca    1140
acaaaagcaa gataacaatt gatattcatt ttcttgagag gaaaatgcaa catcatctcc    1200
taaaagagaa aaatgaggag atatttaatt acaataacca tttaaaaaac cgtatatatc    1260
aatatgaaaa agagaaagca gaaacagaaa actcatgaga gacaagcagt aagaaacttc    1320
ttttggagaa acaacagacc agatctttac tcacaactca tgctaggagg ccagtcctag    1380
cattacctta tgttgaaaaa tcttaccaat agtctgtgtc aacagaatac ttattttaga    1440
agaaaaattc atgatttctt cctgaagcct acagacataa aataacagtg tgaagaatta    1500
cttgttcacg aattgcataa aagctgccca ggatttccat ctaccctgga tgatgccgga    1560
gacatcattc aatccaacca gaatctcgct ctgtcactca ggctggagtg cagtgggcgc    1620
aatctcggct cactgcaact ctgcctccca ggttcacgcc attctctggc acagcctccc    1680
g                                                                    1681
```

```
        <210> 181
        <211> 432
        <212> PRT
        <213> Homo sapien

        <400> 181
Asp Thr Val His Ser Cys Glu Arg Ala Arg Glu Leu Gln Lys Asp His
1               5               10              15
Cys Glu Gln Arg Thr Gly Lys Met Glu Gln Met Lys Lys Lys Phe Cys
            20              25              30
```

57

```
Val Leu Lys Lys Lys Leu Ser Glu Ala Lys Glu Ile Lys Ser Gln Leu
        35                  40                  45
Glu Asn Gln Lys Val Lys Trp Glu Gln Glu Leu Cys Ser Val Arg Leu
    50                  55                  60
Thr Leu Asn Gln Glu Glu Glu Lys Arg Arg Asn Ala Asp Ile Leu Asn
65                  70                  75                  80
Glu Lys Ile Arg Glu Glu Leu Gly Arg Ile Glu Glu Gln His Arg Lys
                85                  90                  95
Glu Leu Glu Val Lys Gln Gln Leu Glu Gln Ala Leu Arg Ile Gln Asp
            100                 105                 110
Ile Glu Leu Lys Ser Val Glu Ser Asn Leu Asn Gln Val Ser His Thr
            115                 120                 125
His Glu Asn Glu Asn Tyr Leu Leu His Glu Asn Cys Met Leu Lys Lys
    130                 135                 140
Glu Ile Ala Met Leu Lys Leu Glu Ile Ala Thr Leu Lys His Gln Tyr
145                 150                 155                 160
Gln Glu Lys Glu Asn Lys Tyr Phe Glu Asp Ile Lys Ile Leu Lys Glu
                165                 170                 175
Lys Asn Ala Glu Leu Gln Met Thr Leu Lys Leu Lys Glu Glu Ser Leu
            180                 185                 190
Thr Lys Arg Ala Ser Gln Tyr Ser Gly Gln Leu Lys Val Leu Ile Ala
        195                 200                 205
Glu Asn Thr Met Leu Thr Ser Lys Leu Lys Glu Lys Gln Asp Lys Glu
    210                 215                 220
Ile Leu Glu Ala Glu Ile Glu Ser His His Pro Arg Leu Ala Ser Ala
225                 230                 235                 240
Val Gln Asp His Asp Gln Ile Val Thr Ser Arg Lys Ser Gln Glu Pro
                245                 250                 255
Ala Phe His Ile Ala Gly Asp Ala Cys Leu Gln Arg Lys Met Asn Val
            260                 265                 270
Asp Val Ser Ser Thr Ile Tyr Asn Asn Glu Val Leu His Gln Pro Leu
        275                 280                 285
Ser Glu Ala Gln Arg Lys Ser Lys Ser Leu Lys Ile Asn Leu Asn Tyr
    290                 295                 300
Ala Gly Asp Ala Leu Arg Glu Asn Thr Leu Val Ser Glu His Ala Gln
305                 310                 315                 320
Arg Asp Gln Arg Glu Thr Gln Cys Gln Met Lys Glu Ala Glu His Met
            325                 330                 335
Tyr Gln Asn Glu Gln Asp Asn Val Asn Lys His Thr Glu Gln Gln Glu
            340                 345                 350
Ser Leu Asp Gln Lys Leu Phe Gln Leu Gln Ser Lys Asn Met Trp Leu
    355                 360                 365
Gln Gln Gln Leu Val His Ala His Lys Lys Ala Asp Asn Lys Ser Lys
    370                 375                 380
Ile Thr Ile Asp Ile His Phe Leu Glu Arg Lys Met Gln His His Leu
385                 390                 395                 400
Leu Lys Glu Lys Asn Glu Glu Ile Phe Asn Tyr Asn Asn His Leu Lys
                405                 410                 415
Asn Arg Ile Tyr Gln Tyr Glu Lys Glu Lys Ala Glu Thr Glu Asn Ser
        420                 425                 430
```

<210> 182
<211> 511
<212> DNA
<213> Homo sapiens

58

<400> 182
gaagtttcat gaggtttagc ttttctgggc tggggagtgg agagaaagaa gttgcagggc 60
ttacaggaaa tcccagagcc tgaggttttc tcccagattt gagaactcta gattctgcat 120
cattatcttt gagtctatat tctcttgggc tgtaagaaga tgaggaatgt aataggtctg 180
ccccaagcct ttcatgcctt ctgtaccaag cttgtttcct tgtgcatcct tcccaggctc 240
tggctgcccc ttattggaga atgtgatttc caagacaatc aatccacaag tgtctaagac 300
tgaatacaaa gaacttcttc aagagttcat agacgacaat gccactacaa atgccataga 360
tgaattgaag gaatgttttc ttaaccaaac ggatgaaact ctgagcaatg ttgaggtgtt 420
tatgcaatta atatatgaca gcagtctttg tgatttattt taactttctg caagaccttt 480
ggctcacaga actgcagggt atggtgagaa a   511

<210> 183
<211> 260
<212> DNA
<213> Homo sapiens

<400> 183
cacctcgcgg ttcagctcct ctgtcttggt gaagaaccat tcctcggcat ccttgcggtt 60
cttctctgcc atcttctcat actggtcacg catctcgttc agaatgcggc tcaggtccac 120
gccaggtgca gcgtccatct ccacattgac atctccaccc acctggcctc tcagggcatt 180
catctcctcc tcgtggttct tcttcaggta ggccagctcc tccttcaggc tctcaatctg 240
catctccagg tcagctctgg   260

<210> 184
<211> 461
<212> DNA
<213> Homo sapiens

<400> 184
gtctgatggg agaccaaaga atttgcaagt ggatggtttg gtatcactgt aaataaaaag 60
agggcctttt ctagctgtat gactgttact tgaccttctt tgaaaagcat tcccaaaatg 120
ctctatttta gatagattaa cattaaccaa cataattttt tttagatcga gtcagcataa 180
atttctaagt cagcctctag tcgtggttca tctctttcac ctgcatttta tttggtgttt 240
gtctgaagaa aggaaagagg aaagcaaata cgaattgtac tatttgtacc aaatctttgg 300
gattcattgg caaataattt cagtgtggtg tattattaaa tagaaaaaaa aaattttgtt 360
tcctaggttg aaggtctaat tgataccgtt tgacttatga tgaccatttta tgcactttca 420
aatgaatttg ctttcaaaat aaatgaagag cagacctcgg c   461

<210> 185
<211> 531
<212> DNA
<213> Homo sapiens

<400> 185
tctgatttta tttccttctc aaaaaaagtt atttacagaa ggtatatatc aacaatctga 60
caggcagtga acttgacatg attagctggc atgatttttt cttttttttc ccccaaacat 120
tgtttttgtg gccttgaatt ttaagacaaa tattctacac ggcatattgc acaggatgga 180
tggcaaaaaa aagtttaaaa acaaaaaccc ttaacggaac tgccttaaaa aggcagacgt 240
cctagtgcct gtcatgttat attaaacata catacacaca atctttttgc ttattataat 300
acagacttaa atgtacaaag atgtttttcca ctttttttcaa tttttaaaca caacagctat 360
aaacctgaac acatatgcta tcatcatgcc ataagactaa acaattata tttagcgaca 420
agtagaaagg attaaatagt caaatacaag aatgaaaaac gcagtacata gtgtcgcgaa 480
ctcaaatcgg catttagata gatccagtgg tttaaacggc acgttttgc t   540

59

```
<210> 186
<211> 441
<212> DNA
<213> Homo sapiens

<400> 186
cattcctttc ctcgcgttgg ggtttctctg tgtcagcgag cctcggtaca ctgatttccg 60
atcaaaagaa tcatcatctt taccttgact tttcagggaa ttactgaact ttcttctcag 120
aagatagggc acagccattg ccttggcctc acttgaaggg tctgcatttg ggtcctctgg 180
tctcttgcca agtttcccaa ccactcgagg gagaaatatc gggaggtttg acttcctccg 240
gggctttccc gagggcttca ccgtgagccc tgcggccctc agggctgcaa tcctggattc 300
aatgtctgaa acctcgctct ctgcctgctg gacttctgag gccgtcactg ccactctgtc 360
ctccagctct gacagctcct catctgtggt cctgttgtac tggacggggt ccccagggtc 420
ctgggggctt ttttcctgtc t                                          441


<210> 187
<211> 371
<212> DNA
<213> Homo sapiens

<400> 187
aaaagtgaat gagtaactat tatattgttg gcaataataa gttgcaaaat catcaggctg 60
caggctgctg atggtgagag tgaactctgt cccagatcca ctgccgctga accttgatgg 120
gaccccagat tctaaactag acgccttatg gatcaggagc tttggggctt tccctggttt 180
ctgttgatac caggccaacc aactactaac actctgactg gcccggcaag tgatggtgac 240
tctgtctcct acagttgcag acagggtgga aggagactgg gtcatctgga tgtcacattt 300
ggcacctggg agccagagca gcaggagccc caggagctga gcggggaccc tcatgtccat 360
gctgagtcct g                                                      371


<210> 188
<211> 226
<212> DNA
<213> Homo sapiens

<400> 188
ggtatataaa ttgagatgcc cccccaggcc agcaaatgtt cctttttgtt caaagtctat 60
ttttattcct tgatattttt ctttttttttt tttttgtgga tggggacttg tgaattttttc 120
taaaggtgct atttaacatg ggaggagagc gtgtgcggct ccagcccagc ccgctgctca 180
ctttccaccc tctctccacc tgcctctggc ttctcaggac ctgccc          226


<210> 189
<211> 391
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(391)
<223> n=A,T,C or G

<400> 189
tgggtgaagt ttattctgtt ttcacatcta ggttgttggg ganagtgata gacaaagttc 60
tggattctgg gcatcgtcgg cgcatgcttg taatcctact tgggaggttg anacaggaga 120
cctcggccgc naccacgcta agggcgaatt ctgcanatat ccatcacact ggcggccgct 180
cgagcatgca tctanagggc ccaattcncc ctatagtgag ncgtattaca attcactggc 240
```

```
cgtcgtttta caacgtcgtg actgggaaaa ccctggcgtt acccaactta atcgccttgc 300
agcacatccc cctttcncca gctggcttaa tancgaagag gcccgcaccg atcgcccttc 360
ccaacanttg cgcagcctga atggcgaatg g                                 391
```

<210> 190
<211> 501
<212> DNA
<213> Homo sapiens

<400> 190
```
catcttggcc tttttgagct gtttccgctt cttctcatcc cggtcactgt caccctcatt 60
actggaggag ctggcagagg cgttgctgtc aaactcctct gccacatctt cctcctcttc 120
acctgggttg aatgactcat cggtttcttc tcctgagtca tcgctgctgt cattggcatt 180
ctcctcccgg atcttgcctt cctccttcat ccctctccaag taggcatcat gctggtcctc 240
atcagagtca gcatattcat cgtagcttgg gttcatgccc tctttcaatc ctcggttttt 300
gatgttgagc ttttttcgcgt tgacaaaatc aaacagtttc ccgtactcct ccctctcaat 360
gctgctgaag gtatactgag tgccctgctt ggtctcaatt tcaaagtcaa aggaacgagt 420
agtagtggta ccacgagcaa agttgacaaa ggagatctca tcgaagcgga tgtgcacagg 480
tggcttgtgg acgtagatga a                                            501
```

<210> 191
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (49)
<223> n=A,T,C or G

<400> 191
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ggaaaaactg tgaaaaatat atctgaattt attaagtaca gtataaaana gggttgtggc 60
aacagaaagt aaaaactaac atggattgct ataaatatgc tgaagcctag ttgttcaaat 120
gatacaattc tctcatgcta ctctaaagtt tataaagaaa aaggatttac actttacaca 180
ctgtacacaa aaggaatacc ttctgagagc cagggagtgg ggaaagggga aggagacttg 240
a                                                                  241
```

<210> 192
<211> 271
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(271)
<223> n=A,T,C or G

<400> 192
```
tggtcntgga ttcacanata aantanatcg actaaaactg gcagaaattg tgaagcaggt 60
gatagaagan caaaccacgt cccacgaatc ccaataatga cagcttcaga ctttgctttt 120
ttaacaattt gaaaaattat tctttaatgt ataaagtaat tttatgtaaa ttaataaatc 180
ataatttcat ttccacattg attaaagctg ctgtatagat ttagggngca ggacttaata 240
atagnggaaa tgaaattatg atttattaat c                                 271
```

<210> 193

```
<211> 351
<212> DNA
<213> Homo sapiens

<400> 193
agtcgaggcg ctgatcccta aaatggcgaa catgtgtttt catcatttca gccaaagtcc 60
taacttcctg tgccttttcct atcacctcga gaagtaatta tcagttggtt tggatttttg 120
gaccaccgtt cagtcatttt gggttgccgt gctcccaaaa cattttaaat gaaagtattg 180
gcattcaaaa agacagcaga caaaatgaaa gaaaatgaga gcagaaagta agcatttcca 240
gcctatctaa tttctttagt tttctatttg cctccagtgc agtccatttc ctaatgtata 300
ccagcctact gtactattta aaatgctcaa tttcagcacc gatggacctg c 360

<210> 194
<211> 311
<212> DNA
<213> Homo sapiens

<400> 194
ctgagacaca gaggcccact gcgagggggga cagtggcggt gggactgacc tgctgacagt 60
caccctccct ctgctgggat gaggtccagg agccaactaa aacaatggca gaggagacat 120
ctctggtgtt cccaccaccc tagatgaaaa tccacagcac agacctctac cgtgtttctc 180
ttccatccct aaaccacttc cttaaaatgt ttggatttgc aaagccaatt tggggcctgt 240
ggagcctggg gttggatagg gccatggctg gtcccccacc atacctcccc tccacatcac 300
tgacacagac c                                                  311

<210> 195
<211> 381
<212> DNA
<213> Homo sapiens

<400> 195
tgtcagagtg gcactggtag aagttccagg aaccctgaac tgtaagggtt cttcatcagt 60
gccaacagga tgacatgaaa tgatgtactc agaagtgtcc tggaatgggg cccatgagat 120
ggttgtctga gagagagctt cttgtcctgt cttttccctt ccaatcaggg gctcgctctt 180
ctgattattc ttcagggcaa tgacataaat tgtatattcg gttcccggtt ccaggccagt 240
aatagtagcc tctgtgacac caggggcgggg ccgagggacc acttctctgg gaggagaccc 300
aggcttctca tacttgatga tgtagccggt aatcctggca cgtggcggct gccatgatac 360
cagcagggaa ttgggtgtgg t                                        381

<210> 196
<211> 401
<212> DNA
<213> Homo sapiens

<400> 196
cacaaacaag aggagcacca gacctcctct tggcttcgag atggcttcgc cacaccaaga 60
gcccaaacct ggagacctga ttgagatttt ccgccttggc tatgagcact gggccctgta 120
tataggagat ggctacgtga tccatctggc tcctccaagt gagtaccccg gggctggctc 180
ctccagtgtc ttctcagtcc tgagcaacag tgcagaggtg aaacgggagc gcctggaaga 240
tgtggtggga ggctgttgct atcgggtcaa caacagcttg gaccatgagt accaaccacg 300
gcccgtggag gtgatcacca gttctgcgaa ggagatggtt ggtcagaaga tgaagtacag 360
tattgtgagc aggaactgtg agcactttgt cacccagacc t                 401

<210> 197
<211> 471
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62

<212> DNA
<213> Homo sapiens

<400> 197
ctgtaatgat gtgagcaggg agccttcctc cctgggccac ctgcagagag ctttcccacc 60
aactttgtac cttgattgcc ttacaaagtt atttgtttac aaacagcgac catataaaag 120
cctcctgccc caaagcttgt gggcacatgg gcacatacag actcacatac agacacacac 180
atatatgtac agacatgtac tctcacacac acaggcacca gcatacacac gtttttctag 240
gtacagctcc caggaacagc taggtgggaa agtcccatca ctgagggagc ctaaccatgt 300
ccctgaacaa aaattgggca ctcatctatt cctttctct tgtgtcccta ctcattgaaa 360
ccaaactctg gaaaggaccc aatgtaccag tatttatacc tctagtgaag cacagagaga 420
ggaagagagc tgcttaaact cacacaacaa tgaactgcag acacagacct g 480

<210> 198
<211> 201
<212> DNA
<213> Homo sapiens

<400> 198
ggtccattga ggctctgtcg gccatgccca cagttcgaag ctttgccaac gaggagggcg 60
aagcccagaa gtttagggaa aagctgcaag aaataaagac actcaaccag aaggaggctg 120
tggcctatgc agtcaactcc tggaccacta gtatttcagg tatgctgctg aaagtgggaa 180
tcctctacat tggtgggcag a   201

<210> 199
<211> 551
<212> DNA
<213> Homo sapiens

<400> 199
tctggcacag atcttcaccc acacggcggt ccacgtgctg atcatcttcc gggtctcacc 60
gggcctggaa cacaccatct tccccatgag cccggtgccc agtctggtga cttccatctt 120
ggcccctggc cttatgtccc agttatgacc cctgacttca actctggctc ttaccctgta 180
actccagtcc atctctgaca tttttaacac ccggccttgt gaccgtggac atagctcctg 240
acctcgattc ccatcttgag cccagtgtta gtccatgaga tcatgacctg actcctggtc 300
tccaaccttg tgatcctaat tctgggacct caatcctagc ctctgaactt gggaccctgg 360
agctcctgac cttagtcctg accgctaccc ttgattctga cctttgatcc tgtaacttag 420
gggtggcccc tgaccttatt actgtcattt agctccttga ccttgccact tcaatcctgg 480
ctttatgacc tcctactctc aattttaact ttaaccaaat gaccaaattt gtgacactaa 540
atgaccacaa t   551

<210> 200
<211> 211
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(211)
<223> n=A,T,C or G

<400> 200
cagctcancg ggcgacatgc ccctacaagt tggcanaagn ggctgccact gctgggtttg 60
tgtaagagag gctgctgnca ccattacctg cagaaacctt ctcataggg ctacgatcgg 120
tactgctagg gggcacatag cgcccatggg tgtggtaggt ggggnactcn ntnataggat 180

63

```
ggtaggtatc ccgggctgga aanatgnnca g                                211

<210> 201
<211> 111
<212> DNA
<213> Homo sapiens

<400> 201
ccagtgaaag gaaacaaaac tggcagtttg tccatttgaa tatcagacct agtttcttct 60
taatttccac actatttctc ccatattcct taaacttctt ggcatccacc t           120

<210> 202
<211> 331
<212> DNA
<213> Homo sapiens

<400> 202
tgaaaataca gaataccagg tggtcccaaa tgtttgaagt tctttgaaca gaaagagaga 60
ggagagagag agagaggaaa attccctaac ccttggttta aagacaatat tcatttattg 120
ctcaaatgat gcttttaagg gaggacagtg gaataaaata aacttttttt ttctccctac 180
aatacataga agggttatca aaccactcaa gtttcaaaat cttttccaggg tccaatatca 240
cttttttttct ttcggttcaa tgaaaagcta aatgtaataa tactaattat agataaaatt 300
ttattttact ttttaaaaat ttgtccagac c                                331

<210> 203
<211> 491
<212> DNA
<213> Homo sapiens

<400> 203
agtcacccag tctacttagt acctggttgc tgcctctgac ctttttcagct tgataccctg 60
ggctttagtg taaccaataa atctgtagtg accttacctg tattccctgt gctatcctgt 120
gggaaggtag gaatgggcta agtatgatga atgtataggt tagggatctt ttggttttaa 180
atcacagaaa acctaattca aactggctta aaataaaaag gatttattgg ttcatgtaac 240
tagaaagtcc ataggtagtg ctggctccag gtgaagactt gacccagtag ttcagtatgt 300
ctctaaatac cggactgact ttttttctcac tgttgcatct tctgtaggac catttaagtc 360
tgggccactt aatggctgcc agcattccta agattacact tttccccatt tatgtccaat 420
cagaaaaaga aggcatcttt gtaccagaaa tctcagcaaa agccctaata ttcacactga 480
ttaggacctg c                                                     491

<210> 204
<211> 361
<212> DNA
<213> Homo sapiens

<400> 204
tcccttcctc ccccatgtga taaatgggtc cagggctgat caaagaactc tgactgcaga 60
actgccgctc tcagtggaca gggcatctgt tatcctgaga cctgtggcag acacgtcttg 120
ttttcatttg attttttgtta agagtgcagt attgcagagt ctagaggaat ttttgtttcc 180
ttgattaaca tgattttcct ggttgttaca tccagggcat ggcagtggcc tcagccttaa 240
actttttgttc ctactcccac cctcagcgaa ctgggcagca cggggagggt ttggctaccc 300
ctgcccatcc ctgagccagg taccaccatt gtaaggaaac actttcagaa attcagacct 360
c                                                                361

<210> 205
```

64

```
<211> 471
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (2)
<223> n=A,T,C or G
<221> misc_feature
<222> (3)
<223> n=A,T,C or G

<400> 205
cnngtacagt tcttcctgga tggccgacac agatcctggg gaaaggcaat cctggcactg 60
ctctgaaacc agagctcctc ctccctcccc gggcagggtg gagctgagaa gggctgctct 120
agcgttggga ctccacctcc atacacctga tattttgata gggcaggtcc ctgctatggg 180
ccactgttct gggcagtata gtatgcttga cagcatcctt ggcatctatc caccagatcc 240
cagagcaccc gctactagct gtgacaacat cctccaaaca ttgcaaaatt tcccctggga 300
ggcaagattg cctcagatgg gagaatcacg ctctagggaa atctgctggt atgagaaccc 360
caactcccca ctccactgag cctccagatg gcgagcaggc tgcagctcca gcacagacac 420
gaagctccct ccagccactg acggtccatg gctggggtta cccaggacct c 480

<210> 206
<211> 261
<212> DNA
<213> Homo sapiens

<400> 206
tagagtattt agagtcctga gataacaagg aatccaggca tcctttagac agtcttctgt 60
tgtcctttct tcccaatcag agatttgtgg atgtgtggaa tgacaccacc accagcaatt 120
gtagccttga tgagagaatc caattcttca tctccacgaa tagcaagttg caagtgacga 180
ggggtaatac gctttacctt taagtctttt gatgcatttc ctgccagttc aagtacctct 240
gcggtgaggt actccaggat g 261

<210> 207
<211> 361
<212> DNA
<213> Homo sapiens

<400> 207
gctctccggg agcttgaaga agaaactggc tacaaagggg acattgccga atgttctcca 60
gcggtctgta tggacccagg cttgtcaaac tgtactatac acatcgtgac agtcaccatt 120
aacggagatg atgccgaaaa cgcaaggccg aagccaaagc caggggatgg agagtttgtg 180
gaagtcattt ctttacccaa gaatgacctg ctgcagagac ttgatgctct ggtagctgaa 240
gaacatctca cagtggacgc cagggtctat tcctacgctc tagcactgaa acatgcaaat 300
gcaaagccat ttgaagtgcc cttcttgaaa ttttaagccc aaatatgaca ctggacctgc 360
c 361

<210> 208
<211> 381
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
```

65

```
<222> (1)...(381)
<223> n=A,T,C or G

<400> 208
agaggagatn tttgccatgc ctgaatnctt tcctatncca ccctancact taacatatta 60
cttagtctgc tttgntaaaa gcaagtatta ccttnaactt gnctcttact cctttgccctt 120
tagctaacta ataaagnttg atntaggcat tattatataa ttctgagtca ttcatggtat 180
ctctcatgtt tgatgtattt tncaaactaa gatctatgat agtttttttt ccanagttcc 240
attaaatcat ttatttcctt tactttctca cctctgtnga aacatttaga aactggattt 300
gggaacccan ttttggaaaa ccagattcat agtcatgaaa atggaaactt ncatattctg 360
tttttgaaaa gatgtggacc t                                           381

<210> 209
<211> 231
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (83)
<223> n=A,T,C or G

<400> 209
gtggagagca agtgatttat taaagcaaga cgttgaaacc tttacattct gcagtgaaga 60
tcagggtgtc attgaaagac agnggaaacc aggatgaaag ttttttacatg tcacacacta 120
catttcttca atattttcac caggacttcc gcaatgaggc ttcgtttctg aagggacatc 180
tgatccgtgc atctcttcac tcctaacttg gctgcaacag cttccacctg c 240

<210> 210
<211> 371
<212> DNA
<213> Homo sapiens

<400> 210
tccatcctgg ttttgcagag atcaggttgt tgacagttcc tggttgaccc acagctaccc 60
atgtcagtta tctccactaa catatccaag aatctttgta ggacaatttc tccacctgca 120
aggttttta ggtagaactc ttcttttaag gcaattagcc cattgccaaa aggtttttact 180
gtcttaaagc tgtctttctg agatctaatt ccaaggactt ctccacagct aagtgagatg 240
cctcacacca ttaggtgatg ctttggacag aacagagtat tttcatcttg tgtttaaagc 300
aattccttgg cttcggctcc tcaccacttt ctatgccagt ctcccattta tgtccctagt 360
aatgcctatg c                                                     371

<210> 211
<211> 471
<212> DNA
<213> Homo sapiens

<400> 211
tttattttaa aagaaaaaaa ttaaaataga gccaacaaat gcaattaaga aaaaaaaagt 60
attgagacac aaggggacct acatgttctg gtctaagaag catgcaagta ttacaaagca 120
ttccagatac agtatgacag aggaacagtg aacaagcatt ggaacgatgc tctttctttc 180
agaaacggga agtctaacag ttatgttttc acaatggtag tgattaaacc atctttattt 240
ttaaggaatt ttataggaag aattttagca ccatcattaa aggaaaaata ataatacctt 300
tttagccctg cctatctcca gtcttggaat aataacagaa gcatagcacc tttcagtatc 360
taaaatataa acaagaatag taagtccatc ccagcttcta gagatgaggt agctcatgct 420
```

66

aagaaatgtt gggtcatttt tcctatgaaa gttcaaaggc caaatggtca c 480

<210> 212
<211> 401
<212> DNA
<213> Homo sapiens

<400> 212
tggcctgtct ccttcacata gtccatatca ccacaaatca cacaacaaaa gggagaggat 60
atattttggg ttcaaaaaaa gtaaaaagat aatgtagctg catttctttg gttattttgg 120
gccccaaata tttcctcatc ttttttgttgt tgtcatggat ggtggtgaca tggacttgtt 180
tatagaggac aggtcagctc tctggctcgg tgatctacat tctgaagttg tctgaaaatg 240
tcttcatgat taaattcagc ctaaacgttt tgccgggaac actgcagaga caatgctgtg 300
agtttccaac ctcagcccat ctgcgggcag agaaggtcta gtttgtccat caccattatg 360
atatcaggac tggttacttg gttaaggagg ggtctacctc g   401

<210> 213
<211> 461
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(461)
<223> n=A,T,C or G

<400> 213
tgtgaagcat acataaataa atgaagtaag ccatactgat ttaatttatt ggatgttatt 60
ttccctaaga cctgaaaatg aacatagtat gctagttatt tttcagtgtt agccttttac 120
tttcctcaca caatttggaa tcatataata taggtacttt gtccctgatt aaataatgtg 180
acggatagaa tgcatcaagt gtttattatg aaaagagtgg aaaagtatat agcttttanc 240
aaaaggtgtt tgcccattct aagaaatgag cgaatatata gaaatagtgn gggcatttct 300
tcctgttagg tggagtgtat gtgttgacat ttctccccat ctcttcccac tctgtttnnt 360
ccccattatt tgaataaagt gactgctgaa nangactttg aatccttatc cacttaattt 420
aatgtttaaa gaaaaaccta taatggaaag tgagactcct t   461

<210> 214
<211> 181
<212> DNA
<213> Homo sapiens

<400> 214
cctgagcttc tactcctttc ccttaagatt cctccaaagc accagctcca taaaatcctt 60
cagctcccca gacccacacc aagaacccca catgttaatt ggatcagcca aatctacaag 120
cagataagtc ctaaggagaa tgccgaagcg tttttcttct tcctcaagcc tagcatgaga 180
c   181

<210> 215
<211> 581
<212> DNA
<213> Homo sapiens

<400> 215
ctgctttaag aatggttttc cacctttcc ccctaatctc taccaatcag acacatttta 60
ttatttaaat ctgcacctct ctctatttta tttgccaggg gcacgatgtg acatatctgc 120

67

```
agtcccagca cagtgggaca aaaagaattt agaccccaaa agtgtcctcg gcatggatct 180
tgaacagaac cagtatctgt catggaactg aacattcatc gatggtctcc atgtattcat 240
ttattcactt gttcattcaa gtatttattg aataccotgcc tcaagctaga gagaaaagag 300
agtgcgcttt ggaaatttat tccagttttc agcctacagc agattatcag ctcggtgact 360
tttctttctg ccaccattta ggtgatggtg tttgattcag agatggctga atttctattc 420
ttagcttatt gtgactgttt cagatctagt ttgggaacag attagaggcc attgtcctct 480
gtcctgatca ggtggcctgg ctgtttcttt ggatccotct gtcccagagc cacccagaac 540
cctgactctt gagaatcaag aaaacaccca gaaaggacct c                    581
```

<210> 216
<211> 281
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(281)
<223> n=A,T,C or G

<400> 216
```
ccgatgtcct gcttctgtgg accaggggct cctctgnngg tggcctcaac cacggctgag 60
atccctagaa gtccaggagc tgtggggaag agaagcactt agggccagcc agccgggcac 120
ccccacttgc gccccgaccc acgctcacgc accagacctg cccnggcggt cgctcnaaag 180
ggcgaattct gcagatatcc atcacactgg cggacgctcg agcatgcatc tagagggccc 240
aattcaccct atantgagtc gtattacaat tcactggccg t                    281
```

<210> 217
<211> 356
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(356)
<223> n=A,T,C or G

<400> 217
```
atagcaggtt tcaacaattg tcttgtagtt tgnagtaaaa agacataaga aagagaaggt 60
gtggtttgca gcaatccgta gttggtttct caccataccc tgcagttctg tgagccaaag 120
gtcttgcaga aagttaaaat aaatcacaaa gactgctgtc atatattaat tgcataaaca 180
cctcaacatt gctcagagtt tcatccgttt ggttaagaaa acattccttc aattcatcta 240
tggcatttgt agtggcattg tcgtctatga actcttgaag aagttctttg tattcagtct 300
tagacacttg tggattgatt gncttggaaa tcacattctc caataaggga cctcgg     360
```

<210> 218
<211> 321
<212> DNA
<213> Homo sapiens

<400> 218
```
ttgtccatcg ggagaaaggt gtttgtcagt tgtttcataa accagattga ggaggacaaa 60
ctgctctgcc aatttctgga tttctttatt ttcagcaaac actttctttta aagcttgact 120
gtgtgggcac tcatccaagt gatgaataat catcaagggt ttgttgcttg tcttggattt 180
atatagagct tcttcatatg tctgagtcca gatgagttgg tcaccccaac ctctggagag 240
ggtctggggc agtttgggtc gagagtcctt tgtgtccttt ttggctccag gtttgactgt 300
```

68

```
ggtatctctg gacctgcctg g                                         321

<210> 219
<211> 271
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (41)
<223> n=A,T,C or G

<400> 219
ccggttaggt ccacgcgggg gcagtggagg cacaggctca nggtggccgg gctacctggc 60
accctatggc ttacaaagta gagttggccc agtttccttc cacctgaggg gagcactctg 120
actcctaaca gtcttccttg ccctgccatc atctggggtg gctggctgtc aagaaaggcc 180
gggcatgctt tctaaacaca gccacaggag gcttgtaggg catcttccag gtggggaaac 240
agtcttagat aagtaaggtg acttgtctaa g                              271

<210> 220
<211> 351
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(351)
<223> n=A,T,C or G

<400> 220
gtcctacgac gaggaccagc ttttcttctt cnactttccc canaacactc gggtgcctcg 60
cctgcccgaa tttgctgact gggctcagga acagggagat gctcctgcca ttttatttga 120
caaagagttc tgcgagtgga tgatccagca aatagggcca aaacttgatg ggaaaatccc 180
ggtgtccaga gggtttccta tcgctgaagt gttcacgctg aagcccctgg agtttggcaa 240
gcccaacact ttggtctgtt ttgtcagtaa tctcttccca cccatgctga cagtgaactg 300
gtagcatcat tccgtccctg tggaaggatt tgggcctact tttgtctcag a         360

<210> 221
<211> 371
<212> DNA
<213> Homo sapiens

<400> 221
gtctgcagaa gcgtgtctga ggtgtccggt ggaggtggca gccgagctct gggactaatc 60
accgtgctgg ggacggcacc gcgtcaggat gcaggcagat ccctgcagaa gtgtctaaaa 120
ttcacactcc tcttctggag ggacgtcgat ggtattagga tagaagcacc aggggacccc 180
acgaacggtg tcgtcgaaac agcagccctt atttgcacac tgggagggcg tgacaccagg 240
aaaaccacaa ttctgtcttt cacggggggc cactgtacac gtctctgtct gggcctcggc 300
cagggtgccg agggccagca tggacaccag gaccagggcg cagatcacct tgttctccat 360
ggtggacctc g                                                    371

<210> 222
<211> 471
<212> DNA
<213> Homo sapiens
```

```
<400> 222
gtccatgttc catcattaat gttccaacat caccagggac acaaagctgc aaaaatgaga 60
agggaaataa ggttagagaa aggatccggg caatcttaag gactgaggaa gacatgttcc 120
ccaacccttg aactcacaaa ccctgaagct caaggattgc atccttcctc caaatctcac 180
tcaacataat aagtgcagaa caacatgcca aagcactgta tgaagcacta gggacaaaga 240
caaggtcaaa atccttgtaa ccaaatttaa tggtattgta atgcagtgtt aacacaggac 300
agtaacagaa cacccaagaa ccaaacagaa gagggtaggg ataagcataa atgaagtaac 360
atgaaataaa cttccaaatg gaaaacttgt ccatacccccc agggcaagtc aactacagtc 420
tcccaaagga cataaattcc acttagggca cactagacag aaaacaatat t 480


<210> 223
<211> 411
<212> DNA
<213> Homo sapiens


<400> 223
agttgctcta caatgacaca caaatcccgt taaataaatt ataaacaagg gtcaattcaa 60
atttgaagta atgttttagt aaggagagat tagaagacaa caggcatagc aaatgacata 120
agctaccgat taactaatcg gaacatgtaa aacagttaca aaaataaacg aactctcctc 180
ttgtcctaca atgaaagccc tcatgtgcag tagagatgca gtttcatcaa agaacaaaca 240
tccttgcaaa tgggtgtgac gcggttccag atgtggattt ggcaaaacct catttaagta 300
aaaggttagc agagcaaagt gcggtgcttt agctgctgct tgtgccgctg tggcgtcggg 360
gaggctcctg cctgagcttc cttccccagc tttgctgcct gagaggaacc a 420


<210> 224
<211> 321
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
<222> (31)
<223> n=A,T,C or G


<400> 224
ggtctgaagt ttgataacaa agaaatatat ntaagacaaa aatagacaag agttaacaat 60
aaaaacacaa ctatctgttg acataacata tggaaacttt ttgtcagaaa gctacatctt 120
cttaatctga ttgtccaaat cattaaaata tggatgattc agtgccattt tgccagaaat 180
tcgtttggct ggatcataga ttaacatttt cgagagcaaa tccaagccat tttcatccaa 240
gtttttgaca tgggatgcta ggcttcctgg tttccatttg ggaaatgtat tcttatagtc 300
ctgtaaagat tccacttctg g                                         321


<210> 225
<211> 251
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
<222> (34)
<223> n=A,T,C or G


<400> 225
atgtctgggg aaagagttca ttggcaaaag tgtnctccca agaatggttt acaccaagca 60
```

70

```
gagaggacat gtcactgaat ggggaaaggg aacccccgta tccacagtca ctgtaagcat 120
ccagtaggca ggaagatggc tttgggcagt ggctggatga aagcagattt gagataccca 180
gctccggaac gaggtcatct tctacaggtt cttccttcac tgagacaatg aattcagggt 240
gatcattctc t                                                    251
```

```
<210> 226
<211> 331
<212> DNA
<213> Homo sapiens

<220>
<221> unsure
<222> (1)...(331)
<223> n=A,T,C or G

<400> 226
gttaggtccc aggcccccg ccaagnggtt accnnnntna ccactcctga cccaaaaatc 60
aggcatggca ttaaaacgtt gcaaattcct ttactgttat cccccccacc accaggacca 120
tgtagggtgc agtctttact ccctaacccg tttcccgaaa aaggtgctac ctcctttcca 180
gacagatgag agagggcagg acttcaggct ggatccacca ctgggctctc cctcccccag 240
cctggagcac gggaggggag gtgacggctg gtgactgatg gatgggtagt gggctgagaa 300
gaggggacta ggaagggcta ttccaggctc a                              331
```

```
<210> 227
<211> 391
<212> DNA
<213> Homo sapiens

<400> 227
aggtctgccc ttgaagtata ggaaggaatc atagttggag gacttctgca ttatttgttg 60
gctgaagcta gaagtgcaac cccctcctga tttctgcagc aagatgaact gccttatccc 120
cagcccgcag gaatgttcat atctgagcaa tcaatgggca ctgtgttcaa ccacgccatt 180
ttcaagattg gctccttaaa ccacccacaa ggcaccagct ctggagaag ctgcagggag 240
aagagaacaa agccctcgct gtgatcagga tgggtgtctc atacctttc tctgggtca 300
ttccaggtat gagacagagt tgaacctgcg catgagcgtg gaggccgaca tcaacggcct 360
gcgcagggtg ctggatgagc tgaccctgga c                              391
```

```
<210> 228
<211> 391
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (35)
<223> n=A,T,C or G

<400> 228
gttgtccata gccacctcct gggatagaag ctttntagtt catagttcga ttagtgtgtc 60
cttaggacat aggtccagcc ctacagatta gctgggtgaa gaaggcaagt gtctcgacag 120
ggcttagtct ccaccctcag gcatggaacc attcaggtg aagcctggga tgtgggcaca 180
ggagactcag gctgatataa aaataacaaa atcagtaata aaaaaattat aaaacctgtt 240
gcttgtctga atagatttga gcaacagtct tgctttgtt aaaatcctgg agccgttaag 300
tcctgaatat tcttctggac atcattgctg gctggagaaa ggagccccag gcccggctcg 360
gctgacatct gtcaggtttg gaagtctcat c                              391
```

71

```
<210> 229
<211> 341
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (202)
<223> n=A,T,C or G

<400> 229
gtccatggct tctcacccag acagtctttc tgggcaactt ggggaagccc ctgttctgct 60
caagtctcac cccatggaag aggtggggga aggggggcctt ggttttttcag gaagacgggt 120
tggagagcac gagtcactac aaagcagtaa aagtgaatgg tgtctccagg ggctgggtcc 180
agaacaccgc ggagagcccc anccataaag gtgtgttccg cctctggcct gcaggaatct 240
ctttgaatct ctttgattgg tggctccaag agcaatggga agtcaacagc caggaggctg 300
gactgggttc cctgggaccc cgaggtccca gaggctgctg g                    341


<210> 230
<211> 511
<212> DNA
<213> Homo sapiens

<400> 230
gtccaagcca aggaaaccat tcccttacag gagacctccc tgtacacaca ggaccgcctg 60
gggctaaagg aaatggacaa tgcaggacag ctagtgtttc tggctacaga aggggaccat 120
cttcagttgt ctgaagaatg gtttttatgcc cacatcatac cattccttgg atgaaacccg 180
tatagttcac aatagagctc agggagcccc taactcttcc aaaccacatg ggagacagtt 240
tccttcatgc ccaagcctga gctcagatcc agcttgcaac taatccttct atcatctaac 300
atgccctact tggaaagatc taagatctga atcttatcct ttgccatctt ctgttaccat 360
atggtgttga atgcaagttt aattaccatg gagattgttt tacaaacttt tgatgtggtc 420
aagttcagtt ttagaaaagg gagtctgttc cagatcagtg ccagaactgt gcccaggccc 480
aaaggagaca actaactaaa gtagtgagat a                               511


<210> 231
<211> 311
<212> DNA
<213> Homo sapiens

<400> 231
ggtccaagta agctgtgggc aggcaagccc ttcggtcacc tgttggctac acagacccct 60
cccctcgtgt cagctcaggc agctcgaggc ccccgaccaa cacttgcagg ggtccctgct 120
agttagcgcc ccaccgccgt ggagttcgta ccgcttcctt agaacttcta cagaagccaa 180
gctccctgga gccctgttgg cagctctagc tttgcagtcg tgtaattggc ccaagtcatt 240
gttttttctcg cctcactttc caccaagtgt ctagagtcat gtgagcctcg tgtcatctcc 300
ggggtggacc t                                                     311


<210> 232
<211> 351
<212> DNA
<213> Homo sapiens

<400> 232
tcgtttagct aataatccct tccttgatga tacactccaa cttcttgttt ttctttattt 60
```

72

```
ctaaaaagcg gttctgtaac tctcaatcca gagatgttaa aaatgtttct aggcacggta 120
ttagtaaatc aagtaaattt catgtcctct taaaggacaa acttccagag atttgaatat 180
aaattttat atgtgttatt gattgtcgtg taacaaatgg cccccacaaa ttagtagctt 240
aaaatagcat ttatgatgtc actgtttttct ttgcctttttc attaatgttc tgtacagacc 300
tatgtaaaca acttttgtat atgcatatag gatagctttt ttgagggtat a 360
```

```
<210> 233
<211> 511
<212> DNA
<213> Homo sapiens
```

```
<400> 233
aggtctggat gtaaggatgg atgctctcta tacatgctgg gttggggatg ctgggactgc 60
acagccaccc ccagtatgcc gctccaggac tctgggacta gggcgccaaa gtgtgcaaat 120
gaaaatacag gatacccagg gaactttgaa tttcagattg tgaaaagaaa acaaatcttg 180
agactccaca atcaccaagc taaaggaaaa agtcaagctg ggaactgctt agggcaaagc 240
tgcctcccat tctattcaca gtcatcccccc tgaggctcac ctgcatagct gattgcttcc 300
tttcccctat cgcttctgta aaaatgcaga ctcactgagc cagactaaat tgtgtgttca 360
gtggaaggct gatcaagaac tcaaaagaat gcaaccttttt gtctcttatc tactacaacc 420
aggaagcccc cacttaaggg ttgtcccacc ttactggact gaaccaaggt acatcttaca 480
cctactgatt gatgtctcat gtcccccctaa g                                  511
```

```
<210> 234
<211> 221
<212> DNA
<213> Homo sapiens
```

```
<400> 234
caggtccagc gaaggggctt cataggctac accaagcatg tccacataac cgaggaagct 60
ctctccatca gcatagcctc cgatgaccat ggtgttccac aaagggttca tcttcgagcg 120
ccggctgtac atggccctgg tcagccatga atgaatagct ctaggactat agctgtgtcc 180
atctcccaga agctcctcat caatcaccat ctggccgaga c                        221
```

```
<210> 235
<211> 381
<212> DNA
<213> Homo sapiens
```

```
<220>
<221> misc_feature
<222> (33)
<223> n=A,T,C or G
```

```
<400> 235
ggtccaagaa agggacatct atgtgaaagt ganactgaga cagtgctggt cacaggtcat 60
gctgcagaat aatacattcc caggcactgt cacgtggggg acccaagagg ccccaggagt 120
gacctataac ctctccagaa agaccactct gtgtggcatc acagtccaca cagtttaagg 180
aaatatttag acttaacaat cagacaccag ctcttactca cacttacact cacagcccac 240
acacaagtgt gcaaacatac acacacatat atatttcctg atacattcat ggaatatcag 300
agccctgccc tgaagtcgtt agtgtctctg ctccccaaac cgctgctccc acattggcta 360
agctccctca agagacctca g                                              381
```

```
<210> 236
<211> 441
<212> DNA
```

<213> Homo sapiens

<400> 236
aggtcctgtt gcccctttct tttgcccaac ttcgccattt gggaattgga atatttaccc 60
aacacctgta ctgcattgaa tattggaagc aaataacttg gctttgatct tataggctca 120
cagatggagg aacgtacctt gaagttcaga tgagatttcg gactttttgag ttgatgctga 180
aacagcttga dattttttggg gactactgag agatgataat tgtattgtgc aatatgagaa 240
ggacatgaga tttggtgggc ataggtgtga aatgacattg tttggatgtg tttaccctcc 300
aaatctcttg ttgaatgtga tcttaaacgt tggtggtggg cctagtggaa ggtgttgaat 360
catgggggtg gactcttcat aatttgctta gctccatccc cttggtgatg agcaagtcct 420
tgctctgttg tgtcacatga g   441

<210> 237
<211> 281
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(281)
<223> n=A,T,C or G

<400> 237
tcctaaaaaa ttagctgacc ttgttaaaaa tgttggcgtg agcagtatat tattacctat 60
cttttttttat tgtgtgtgtg ngtgtgtgtn ttaaactaat tggctgaaat atctgcctgt 120
ttccctcttt acatttttct tgtttctttc cttatttatc tttgtccatc ttgagatcta 180
ctgtaaagtg aatnttttaa tgaaaacann nccaagttnt actctcactg ggnctgggac 240
atcagatgta attgagaggc caacaggtaa gtcttcatgt c   281

<210> 238
<211> 141
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(141)
<223> n=A,T,C or G

<400> 238
gtctgcctcc tcctactgtt tccctctatn aaaaagcctc cttggcgcag gttccctgag 60
ctgtgggatt ctgcactggt gcttnggatt ccctgatatg ttccttcaaa tccactgaga 120
attaaataaa catcgctaaa g   141

<210> 239
<211> 501
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(501)
<223> n=A,T,C or G

<400> 239

74

```
aacaatctaa acaaatccct cggttctann atacaatgga ttccccatat tggaaggact 60
ctgangcttt attccccac tatgcntatc ttatcatttt attattatac acacatccat 120
cctaaactat actaaagccc tttttcccatg catggatgga aatggaagat tttttttaa 180
cttgttctag aagtcttaat atgggctgtt gccatgaagg cttgcagaat tgagtccatt 240
ttctagctgc ctttattcac atagtgatgg ggtactaaaa gtactgggtt gactcagaga 300
gtcgctgtca ttctgtcatt gctgctactc taacactgag caacactctc ccagtggcag 360
atcccctgta tcattccaag aggagcattc atcccttttgc tctaatgatc aggaatgatg 420
cttattagaa aacaaactgc ttgacccagg aacaagtggc ttagcttaag naaacttggc 480
tttgctcana tccctgatcc t                                         501
```

```
<210> 240
<211> 451
<212> DNA
<213> Homo sapiens
```

```
<400> 240
tgtcctgaaa ggccattact aatagaaaca cagcctttcc aatcctctgg aacatattct 60
gtctgggttt ttaatgtctg tggaaaaaaa ctaaacaagt ctctgtctca gttaagagaa 120
atctattggt ctgaaggttt ctgaacctct ttctggttct cagcagaagt aactgaagta 180
gatcaggaag gggctgcctc aggaaaattc ctagatccta ggaattcagt gagaccctgg 240
gaaggaccag catgctaatc agtgtcagtg aatccacagt·ctttacttcc tgcctcataa 300
agggccaggt ctccccagta ccaagtcctt tcctcatgaa gttgtgttgc ctcaggctgt 360
ttagggacca ttgcctgtct tggtcacatg agtctgtctc cttactttag tccctgggca 420
atccttgctt aatgcttttg ttgactcaac g                              451
```

```
<210> 241
<211> 411
<212> DNA
<213> Homo sapiens
```

```
<220>
<221> misc_feature
<222> (1)...(411)
<223> n=A,T,C or G
```

```
<400> 241
aatctccagt gtgatggtat cggggttaga gcttcaatct ccagtgtgat ggtactgcag 60
cnagagcttc aatctccagt gngatggtat tagggttaga tcttcaatct ccagtgtgat 120
ggtatcaggg ttagagcttc agcctccagt gtgatggtat cagggttaga gcttcagcct 180
ccagtgtgat ggtatcgggg ttagatcttc aatccccagt ggtggtggtt agagcttcaa 240
tctccagtgt gatggtattg gggttagagc ttcaatctcc agtctgatgg tgtttcggga 300
tggggctttt aagatgtaat tagggtttaa gatcataagg gacctggtct gatggggatt 360
agtncgcttn tatgaagaga cacangaggg cttgctctat ctctgactct c 420
```

```
<210> 242
<211> 351
<212> DNA
<213> Homo sapiens
```

```
<400> 242
ttccccttca caacagtaga gacctacaca gtgaactttg gggacttctg agatcagcgt 60
cctaccaaga ccccagccca actcaagcta cagcagcagc acttcccaag cctgctgacc 120
acagtcacat cacccatcag cacatggaag gcccctggta tggacactga aaggaagggc 180
tggtcctgcc cctttgaggg ggtgcaaaca tgactgggac ctaagagcca gaggctgtgt 240
agaggctcct gctccacctg ccagtctcgt aagaaatggg gttgctgcag tgttggagta 300
```

```
ggggcagagg gagggagcca aggtcactcc aataaaacaa gctcatggca c 360
```

<210> 243
<211> 241
<212> DNA
<213> Homo sapiens

<400> 243
```
gtctgtgctt tatcaggaaa agcacaagaa tatgttttc tacctaaaac cctcttctac 60
tttaaaaatg gtttgctgaa tttttctatg tttttaaaat gttttatgc ttttttttaa 120
acacgtaaag gatggaacct aatcctctcc cgagacgcct cctttgtgtt aatgcctatt 180
cttacaacag agaaacaagt acattaatat aaaaacgagt tgattattgg ggtataaaat 240
a                                                                  241
```

<210> 244
<211> 301
<212> DNA
<213> Homo sapiens

<400> 244
```
ggtccagagc aatagcgtct gtggtgaagc gcctgcactc ctcgggagac atgcctggct 60
tatatgctgc atccacataa ccatagataa aggtgctgcc ggagccacca atggcaaaag 120
gctgtcgagt cagcattcct cccagggttc catataccctg acctccttca cgttggtccc 180
agccagctac catgagatgt gcagacaagt cctctcgata tttatagctg atatttctca 240
ccacatttgc agcagccaaa acaagtggag gttcctccag ttctatccca tggagctcca 300
g                                                                  301
```

<210> 245
<211> 391
<212> DNA
<213> Homo sapiens

<400> 245
```
ctgacactgc tgatgtgggc cggggggcgc cgaggcacaa ctggtggccg gaccattgag 60
gcacctggag ggtaggcagc ttgtggtgca gacaccacag agagagaaaa gttggatgga 120
gtggtgggaa taatcagggt ggcacactgt gcctagaagc ttccagggcc accaagagaa 180
tgggaaggga aactacaaca ttcacaacag aaataggagt caattcactt agacccagaa 240
ctccagaaag ggggagtgta ggaatctaca atttcaaagc cagctcgtgt ctacctagag 300
ccccaaactg cataagcacc aggattgtac accttagtcc ctcaagatag tttcaagtga 360
gcgtgcaatt cactcttaca gaggagggcc t                                  391
```

<210> 246
<211> 291
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(291)
<223> n=A,T,C or G

<400> 246
```
tcctccacag gggaagcagg aagttngacc agcttcaggc tggaacgtgc ccagggcaca 60
gagctggcaa ggtgcaaagn cntctgcaga atattcacca ggttgacaca gacctccaca 120
ttcagacata ttccaagctt ctggggtctt cagggcccca gaatttcctg gtcttgggca 180
```

tggtncacaa gtcatttgtc cttcctcatt ttggaaggtt ccatttggac ataaaatgca 240
agcgttctcg tgctncatna taataggtcc cagcctgcac tgacacattt g 300

<210> 247
<211> 471
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(471)
<223> n=A,T,C or G

<400> 247
cactgagtga atgagtatat aatttatgaa aacagaaaag tgctttggaa aaaaaaaaag 60
acaacaggag tacatacagn gaaccaaaaa gagtgtacca ggaggagcan accctgaaca 120
gttanaacta tggaaatcgc tatgctttgt gttgtcacag gagttaaaat aggaataccc 180
tgcatacaat aaatatttat tggataaaata actaagcctg ataccctttt caatgcgtta 240
tacanactnt atcatcacac cactaatcta agttctcana agttaaacat tacaagactt 300
cagaacaaca taggcgtntt tggctccatt taacanaana aggaccatag tgatcattta 360
atctctatga gtctgtctta tcttctggaa aaggggccta acaccatttc cttttgcaaa 420
aaggtagctg ccttgcttcc agttctacca tcctntagca acccatcttt n 480

<210> 248
<211> 551
<212> DNA
<213> Homo sapiens

<400> 248
ccatgggatc aggaatgggg tcaggtcagt tgacctgagc atacccatta aacatgttca 60
aatgtcccca tcccacccac tcacatgaca tggctcccga gccctgagat ctgtatccca 120
agaacctcag ttgagaaata tttatggcag cttcactgtt gctcaagagc ctgggtattg 180
tagcagcctg ggggcaggtt gtccctaatg ttctccaagt tcttcacatc agccagaatc 240
ccatctatgc ttgtctccag caaatggagg tggcccctct gctgacgtgc cctctcttcc 300
agctctgaca tcatgggccg cagttggctg ttgatctggg tcttggctcg ggaaagcttc 360
tgctccagta agaccagccc ctcttcatct acactgagag gctggtccat cagatgcagg 420
aggccgtcta atgtgttgag tgtgtcttgg attgtaaccc cagcgttctt ggctctggta 480
tcaaccttct gggcttctgt aatcaccatc tgtactgcat ccatattcgt gtcgaactcc 540
agctccttcc t 551

<210> 249
<211> 181
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(181)
<223> n=A,T,C or G

<400> 249
atntccagag ggaccgtaag actggtacaa gtttacacca taagaggcga cgtggtcagc 60
cacaatgtct tcacctccac aggggctcat cacggnggtc agggcaaggg cccccagcat 120
cagagctttg tttaggatca tcctcttccc aaggcagcct tagcagttgc tgacctgccc 180
g 181

77

```
<210> 250
<211> 551
<212> DNA
<213> Homo sapiens

<400> 250
tctgtagcta ggatgagctg gctctcaagc aaaagtttgt cttcctgggt ccatttgtgg 60
ttatcacttg ttattgaatg tacatcacaa attaaagtct gcattgttgg acgtaagaga 120
atgtgccgac tttggtaacc aggagatttc atgttactgg actgcctgta gtcacgtatt 180
tctgctatga cacatccgca atgaaaaata ttaacctgag attttTctag gagatcaacc 240
aaaataggag gtaattcttc tgcatccaaa tattcaagca actctccttc ttcatagggc 300
agtcgaatgg tctcggaatc tgatccgttt tttcccctga gcatcagaga atatccctca 360
tttcctgggt atagattgac cactaaacat gacaaagtct cttgcataac aagcttctct 420
aacaagttca catttcttct taatttctta acttcaggtt cttttTcaca ttcttcaata 480
tacaagtcat aaagtttttg aaatacagat tttcttccac ttgataggta tttcctttta 540
ggaggtctct g                                                           551

<210> 251
<211> 441
<212> DNA
<213> Homo sapiens

<400> 251
tgtctgctct cccatcctgg ttactatgag tcgctcttgg cagaaaggac cacagatgga 60
gagcttggca ctcgctccaa ctttgccgaa aagaggacaa ccaccaaagt agtaggtaaa 120
aacacaattt tagcagcagt gaaataaaaa gaggaagtga ggatggggcc aggccgcaac 180
tataattaaa ctgtctgttt aggagaagct gaatccagaa gaaacacaag ctgtaaagtg 240
agagaggaca gggagcaggg cctttggaga gcaggagagg acaggctgtc accaagcgct 300
gctcggactc tgccctgaaa gatttgaatt ggacactgtc cagtcacgtg tgtggcaaac 360
cgtactccaa gcacttttct cacggcagag gaaggagctg ccatggctgt acccctgaac 420
gtttgtgggg ccagcgatgt g                                                 441

<210> 252
<211> 406
<212> DNA
<213> Homo sapiens

<400> 252
ttttttttg aacaagtaaa aatttctttA tttgctgaca ataagataac ctacagggaa 60
aacctgatga aatctattaa aaagttacta aaactaataa aagaatttag gaaggttata 120
gaatgtaaga ccaagacaca aaaatcaatt acatttctat ataatagcaa tgaacagata 180
ctgaaatttt aaaaactaaa tcattttaca aaagtatcac aatatgaaac actccgggat 240
aaattggata aaagatgtgc aagactgtac aaaagctaca aaacatttat gaaggaaatt 300
ggaagataga aacaagatag aaaatgaaaa tattgtcaag agtttcagat agaaaatgaa 360
aaacaagcta agacaagtat tggagaagta tagaagatag aaaaat          406

<210> 253
<211> 544
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (224)
```

78

<223> n=A,T,C or G

<400> 253
gaaggagttc agtagcaaag tcacacctgt ccaattccct gagctttgct cactcagcta 60
atgggatggc aaaggtggtg gtgctttcat cttcaggcag aagcctctgc ccatccccct 120
caagggctgc aggcccagtt ctcatgctgc ccttgggtgg gcatctgtta acagaggaga 180
acgtctgggt ggcggcagca gctttgctct gagtgcctac aaanctaatg cttggtgcta 240
gaaacatcat cattattaaa cttcagaaaa gcagcagcca tgttcagtca ggctcatgct 300
gcctcactgc ttaagtgcct gcaggagccg cctgccaagc tcccctttcct acacctggca 360
cactggggtc tgcacaaggc tttgtcaacc aaagacagct tcccccttttt gattgcctgt 420
agactttgga gccaagaaac actctgtgtg actctacaca cacttcaggt ggtttgtgct 480
tcaaagtcat tgatgcaact tgaaaggaaa cagtttaatg gtggaaatga actaccattt 540
ataa   544

<210> 254
<211> 339
<212> DNA
<213> Homo sapiens

<400> 254
tggcattcag ggcagtgtct tctgcatctc ctaggaacct cgggagcggc agctccggcg 60
cctggtagcg agaggcgggt tccggagatc ccggcctcac ttcgtcccac tgtggttagg 120
ggtgagtcct gcaaatgtta agtgatttgc tcaaggtgcc catttcgcag gaattggagc 180
ccaggccagt tctctgagcc tatcattagg gctaaaggag tgcgtgatca gaatggtgtc 240
tggacggttc tacttgtcct gcctgctgct ggggtccctg ggctctatgt gcatcctctt 300
cactatctac tggatgcagt actggcgtgg tggctttgc   339

<210> 255
<211> 405
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(405)
<223> n=A,T,C or G

<400> 255
gaggtttttt nttttttttt tttttttttt caattaaana tttgatttat tcaagtatgt 60
gaaaacattn tacaatggaa acttttntta aatgctgcat gtnctgtgct atggaccacn 120
cacatacagc catgctgttt caaaaaactt gaaatgccat tgatagttta aaaactntac 180
ncccgatgga aaatcgagga aaacaattta atgtttcatn tgaatccana ggngcatcaa 240
attaaatgac agctccactt ggcaaataat agctgttact tgatggtatc caaaaaaaaa 300
tggttggggga tggataaatt caaaaatgct tccccaaagg ngggnggttt ttaaaaagtt 360
tcaggncaca acccttgcan aaaacactga tgcccaacac antga   405

<210> 256
<211> 209
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (6)
<223> n=A,T,C or G

79

<400> 256
gggcangtct ggtcctctcc ccacatgtca cactctcctc agcctctccc ccaaccctgc 60
tctccctcct cccctgccct agcccaggga cagagtctag gaggagcctg gggcagagct 120
ggaggcagga agagagcact ggacagacag ctatggtttg gattgggaa gaggttagga 180
agtaggttct taaagaccct tttttagta   209

<210> 257
<211> 343
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(343)
<223> n=A,T,C or G

<400> 257
tctggacacc ataatccctt ttaagtggct ggatggtcac acctctccca ttgacaagct 60
gggttaagtc aataggttga ctaggatcaa cacgacccaa atcaataaga tactgcagtc 120
tattgagact caaaggctta tactggcgtc tgaaactatg tccttcgtta aacccgtatt 180
ttgggattcg gatgtaaaat ggagtctggc ctccctcaaa gcccaagcgg ggccgggttc 240
ctctttgcct ttctcctta tggcctctgc cacattttct acctcttctc cgacctcttg 300
gtcttntctc nggtttcttg gagccgggat tcggctttaa gtn   343

<210> 258
<211> 519
<212> DNA
<213> Homo sapiens

<400> 258
gcggcttctg acttctagaa gactaaggct ggtctgtgtt tgcttgtttg cccacctttg 60
gctgataccc agagaacctg ggcacttgct gcctgatgcc caccctgcc agtcattcct 120
ccattcaccc agcgggaggt gggatgtgag acagcccaca ttggaaaatc cagaaaaccg 180
ggaacaggga tttgcccttc acaattctac tccccagatc ctctcccctg gacacaggag 240
acccacaggg caggaccta agatctgggg aaaggaggtc ctgagaacct tgaggtaccc 300
ttagatcctt ttctacccac tttcctatgg aggattccaa gtcaccactt ctctcaccgg 360
cttctaccag ggtccaggac taaggcgttt tctccatagc ctcaacattt tgggaatctt 420
cccttaatca cccttgctcc tcctgggtgc ctggaagatg gactggcaga gacctctttg 480
ttgcgttttg tgctttgatg ccaggaatgc cgcctagtt   519

<210> 259
<211> 371
<212> DNA
<213> Homo sapiens

<400> 259
attgtcaact atatacacag tagtgaggaa taaaatgcac acaaaacaat ggatagaata 60
tgaaaatgtc ttctaaatat gaccagtcta gcatagaacc ttcttctctt ccttctcagg 120
tcttccagct ccatgtcatc taacccactt aacaaacgtg gacgtatcgc ttccagaggc 180
cgtcttaaca actccatttc caaaagtcat ctccagaaga catgtatttt ctatgatttc 240
ttttaaacaa atgagaattt acaagatgtg taactttcta actctatttt atcatacgtc 300
ggcaacctct ttccatctag aagggctaga tgtgacaaat gttttctatt aaaaggttgg 360
ggtggagttg a   371

80

```
<210> 260
<211> 430
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(430)
<223> n=A,T,C or G

<400> 260
ttggattttt tgacttgcga tttcagtttt tttacttttt tttttttttt ttttganaaa 60
tactatattt attgtcaaag agtggtacat aggtgagtgt tcatcttccc tctcatgccg 120
gtatactctg cttcgctgtt tcagtaaaag ttttccgtag ttctgaacgt cccttgacca 180
caccataana caagcgcaag tcactcanaa ttgccactgg aaaactggct caactatcat 240
ttgaggaaag actganaaag cctatcccaa agtaatggac atgcaccaac atcgcggtac 300
ctacatgttc ccgttttttct gccaatctac ctgtgtttcc aagataaatt accacccagg 360
gagtcacttc ctgctatgtg aacaaaaacc cggtttcttt ctggaggtgc ttgactactc 420
tctcgngagc                                                       430


<210> 261
<211> 365
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (178)
<223> n=A,T,C or G

<400> 261
tcctgacgat agccatggct gtaccactta actatgattc tattccaact gttcagaatc 60
atatcacaaa atgacttgta cacagtagtt tacaacgact cccaagagag gaaaaaaaaa 120
aaaaaagacg cctcaaaatt cactcaactt ttgagacagc aatggcaata ggcagcanag 180
aagctatgct gcaactgagg gcacatatca ttgaagatgt cacaggagtt taagagacag 240
gctggaaaaa atctcatact aagcaaacag tagtatctca taccaagcaa aaccaagtag 300
tatctgctca gcctgccgct aacagatctc acaatcacca actgtgcttt aggactgtca 360
ccaaa                                                            365


<210> 262
<211> 500
<212> DNA
<213> Homo sapiens

<400> 262
cctagatgtc atttgggacc cttcacaacc attttgaagc cctgtttgag tccctgggat 60
atgtgagctg tttctatgca taatggatat tcggggttaa caacagtccc ctgcttggct 120
tctattctga atccttttct ttcaccatgg ggtgcctgaa gggtggctga tgcatatggt 180
acaatggcac ccagtgtaaa gcagctacaa ttaggagtgg atgtgttctg tagcatccta 240
tttaaataag cctattttat cctttggccc gtcaactctg ttatctgctg cttgtactgg 300
tgcctgtact tttctgactc tcattgacca tattccacga ccatggttgt catccattac 360
ttgatcctac tttacatgtc tagtctgtgt ggttggtggt gaataggctt cttttttacat 420
ggtgctgcca gcccagctaa ttaatggtgc acgtggactt ttagcaagcg ggctcactgg 480
aagagactga acctggcatg                                            500
```

81

```
<210> 263
<211> 413
<212> DNA
<213> Homo sapiens

<400> 263
ctcagagagg ttgaaagatt tgcctacgaa agggacagtg atgaagctaa gctctagatc 60
caggatgtct gacttcaaat tgaaactccc aaagtaatga gtttggaagg gtggggtgtg 120
gcctttccag gatggggggtc ttttctgctc ccagcggata gtgaaacccc tgtctgcacc 180
tggttgggcg tgttgctttc ccaaaggttt ttttttttagg tccgtcgctg tcttgtggat 240
taggcattat tatctttact ttgtctccaa ataacctgga gaatggagag agtagtgacc 300
agctcagggc cacagtgcga tgaggaccat cttctcacct ctctaaatgc aggaagaaac 360
gcagagtaac gtggaagtgg tccacaccta ccgccagcac attgtgaatg aca 420

<210> 264
<211> 524
<212> DNA
<213> Homo sapiens

<400> 264
tccaatgggg ccctgagagc tgtgacagga actcacactc tggcactggc agcaaaacac 60
cattccaccc cactcatcgt ctgtgcacct atgttcaaac tttctccaca gttccccaat 120
gaagaagact catttcataa gtttgtggct cctgaagaag tcctgccatt cacagaaggg 180
gacattctgg agaaggtcag cgtgcattgc cctgtgtttg actacgttcc cccagagctc 240
attaccctct ttatctccaa cattggtggg aatgcacctt cctacatcta ccgcctgatg 300
agtgaactct accatcctga tgatcatgtt ttatgaccga ccacacgtgt cctaagcaga 360
ttgcttaggc agatacagaa tgaagaggag acttgagtgt tgctgctgaa gcacatcctt 420
gcaatgtggg agtgcacagg agtccaccta aaaaaaaaaa tccttgatac tgttgcctgc 480
cttttttagtc accccgtaac aagggcacac atccaggact gtgt          524

<210> 265
<211> 344
<212> DNA
<213> Homo sapiens

<400> 265
tcctttcttc tacttcagga gatgattcaa agttacttgt ggacatttct ttaagttctg 60
aagacaaatg agacaggatt tggcctgcgg gttcttcaga cttctctacc acctccatta 120
actcttcatc ttggcttgac gtaggcaatg cactattttg ctcttttgtt tctggagatg 180
acccagcacc acttctttct cttggcgggg ttctaagtgt gtctttgaat accagtgaag 240
actcaggcct atcctgtact ggaaagggac taaatttgtc tttctgtcta ggaggtgatg 300
cagtagcatc ctcctgaggg ggtaaggcca ttttctctttt ttga          344

<210> 266
<211> 210
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (78)
<223> n=A,T,C or G

<400> 266
ccacaatgtc cataacttga gcaggctttg gcatcccacc accccccttca gaccaataca 60
```

82

```
cactatgttg gaggaacnac tttaaaatgt aaaatgagaa atgggcactg aacactccat 120
cctcactccc aacagcccac ccacacacct cttcaactgc tatccaaaca tggaggagct 180
cttgtggaag agaggctcaa caccaaataa                                      210
```

<210> 267
<211> 238
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(238)

<400> 267
```
tcggncctcc caccctctna ctgaaattct ntgaaattct cccctttggg atgaggatgg 60
caaccccagg catgtaccct cccaacctgg gacccgacct aatacctaa catcctgctg 120
acagtggctg ttctcgctgg gcaggcgtcc caaagcacat cgagccagat tcaggcagag 180
tggaactggc ccctcagcca tcagtggagg tggcctggga ggctctaccc tgaacggg 240
```

<210> 268
<211> 461
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (459)
<223> n=A,T,C or G

<400> 268
```
tcctcaagga catgcccctt gatagaaact cagttcctgt ctccagttcc ctcctggacc 60
tgatccccca aatgcagggc ctgggactat atccagttcc ttattttcag aggcccatgc 120
acaagatgca cagcaaataa gtgctgaata aagacccagc tactgctagc ttaccctgct 180
ccaaacattc accaagtcct cagcaaagag ggccatccat tcacctcttc taaaaacaca 240
ctgagctccc cagtctatac cccaagatat gcttggctcc caactatccc tcctctctca 300
tctccaagcc agtttcccct ttctaagtat actgatatta ccaaagacac tgacaatctt 360
cttttcctac ctctccccag tgactaggtt tgcagcagga gctctataag tcctagtata 420
cagcagaagc tccataaatg tgtgctgacc taacattang c                       461
```

<210> 269
<211> 434
<212> DNA
<213> Homo sapiens

<400> 269
```
ctgtgttggt gagcaccgat tcccactcaa tatggcgtgg cttacagtct tcattaggtt 60
cccgctccca accagaatga ggaatgatca cttcatctgt caaggcatgc agtgcatggt 120
ccacaatctc cattttgatt gagtcatggg atgaaagatt ccacagggtt ccggtaataa 180
cttcagtaag gtccatatca cgagcctttc gaagcaatcg cacaagggca ggcacaccat 240
cacagttttt tatggcaatc ttgttatcct ggtcacgtcc aaaagagata ttcttgagag 300
ctccacaggc tccaaggtgc acttcctttt tgggatggtc taacaatccc accagtactg 360
ggatgccctt gagcttccgc acgtcagtct tcaccttgtc attgcggtag cataagtgtt 420
gcaggtatgc aaga                                                     434
```

<210> 270

```
<211> 156
<212> DNA
<213> Homo sapiens

<400> 270
ctgcaccagc gattaccagt ggcattcaaa tactgtgtga ctaaggattt tgtatgctcc 60
ccagtagaac cagaatcaga caggtatgag ctagtcaaca gcaagtcttt gttggattcg 120
agtaggctca ggatctgctg aaggtcggag gagtta                          156

<210> 271
<211> 533
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(533)
<223> n=A,T,C or G

<400> 271
ccactgtcac ggtctgtctg acacttactg ccaaacgcat ggcaaggaaa aactgcttag 60
tgaagaactt agaagctgtg gagaccttgg ggtccacgtn caccatctgc tctgataaaa 120
ctggaactct gactcanaac cggatgacag tggcccacat gtggtttgac aatcaaatcc 180
atgaagctga tacgacagag aatcagagtg gtgtctcttt tgacaagact tcagctacct 240
ggcttgctct gtccagaatt gcaggtcttt gtaacagggc agtgtttcag gctaaccagg 300
aaaacctacc tattcttaag cgggcagttg caggagatgc ctctgagtca gcactcttaa 360
agtgcataga gctgtgctgt ggntncgtga aggagatgag agaaagatac nccaaaatcg 420
tcgagatacc cttcaactcc accaacaagt accagttgtc tattcataag aaccccaaca 480
catcggagcc ccaacacctg ttggtgatga agggcgcccc agaaaggatc cta 540

<210> 272
<211> 630
<212> DNA
<213> Homo sapiens

<400> 272
tggtattttt ctttttcttt tggatgtttt atactttttt ttcttttttc ttctctattc 60
ttttcttcgc cttcccgtac ttctgtcttc cagttttcca cttcaaactt ctatcttctc 120
caaattgttt catcctacca ctcccaatta atctttccat tttcgtctgc gtttagtaaa 180
tgcgttaact aggcttttaaa tgacgcaatt ctccctgcgt catggatttc aaggtctttt 240
aatcaccttc ggtttaatct ctttttaaaa gatcgccttc aaattatttt aatcacctac 300
aactttttaaa ctaaacttta agctgtttaa gtcaccttca ttttaatcta aaagcattgc 360
cctctattg gtattaattc ggggctctgt agtcctttct ctcaattttc ttttaaatac 420
attttttact ccatgaagaa gcttcatctc aacctccgtc atgttttaga aacctttat 480
ctttttccttc ctcatgctac tcttctaagt cttcatattt tctcttaaaa tcttaagcta 540
ttaaaattac gttaaaaact taacgctaag caatatctta gtaacctatt gactatattt 600
tttaagtagt tgtattaatc tctatctttc                                 630

<210> 273
<211> 400
<212> DNA
<213> Homo sapiens

<400> 273
tctggtttgc cctccagttc attctgaatc tagacttgct cagcctaatc aagttcctgt 60
```

```
acaaccagaa gcgacacagg ttcctttggt atcatccaca agtgaggggt acacagcatc 120
tcaacccttg taccagcctt ctcatgctac agagcaacga ccacagaagg aaccaattga 180
tcagattcag gcaacaatct ctttaaatac agaccagact acagcatcat catcccttcc 240
tgctgcgtct cagcctcaag tatttcaggc tgggacaagc aaacctttac atagcagtgg 300
aatcaatgta aatgcagctc cattccaatc catgcaaacg gtgttcaata tgaatgcccc 360
agttcctcct gttaatgaac cagaaacttt aaaacagcaa                        400
```

<210> 274
<211> 351
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (2)
<223> n=A,T,C or G

<400> 274
```
tntgagtatg tcccagagaa ggtgaagaaa gcggaaaaga aattagaaga gaatccatat 60
gaccttgatg cttggagcat tctcattcga gaggcacaga atcaacctat agacaaagca 120
cggaagactt atgaacgcct tgttgcccag ttccccagtt ctggcagatt ctggaaactg 180
tacattgaag cagaggttac tatttattt tatttttct tatatcagta ttgcagcatt 240
cactgtagtg atagaaaaca agttaggaac atagccaatt aggacaagga ggatttaaat 300
gtgtcttacc tttattttgt aaaataggta taaaggagta attaaaatga a 360
```

<210> 275
<211> 381
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(381)
<223> n=A,T,C or G

<400> 275
```
gcgnggtcgc nnncgaggtc tgagaagccc ataccactat ttgttgagaa atgtgtggaa 60
tttattgaag atacagggtt atgtaccgaa ggactctacc gtgtcagcgg gaataaaact 120
gaccaagaca atattcaaaa gcagtttgat caagatcata atatcaatct agtgtcaatg 180
gaagtaacag taaatgctgt agctggagcc cttaaagctt tctttgcaga tctgccagat 240
cctttaattc catattctct tcatccagaa ctattggaag cagcaaaaat cccggataaa 300
acagaacgtc ttcatgcctt gaaagaaatt gttaagaaat ttcatcctgt aaactatgat 360
gtattcagat acgtgataac a                                           381
```

<210> 276
<211> 390
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (5)
<223> n=A,T,C or G

<400> 276

```
gctcngactc cggcgggacc tgctcggagg aatggcgccg ccgggttcaa gcactgtctt 60
cctgttggcc ctgacaatca tagccagcac ctgggctctg acgcccactc actacctcac 120
caagcatgac gtggagagac taaaagcctc gctggatcgc cctttcacaa atttggaatc 180
tgccttctac tccatcgtgg gactcagcag ccttggtgct caggtgccag atgcaaagaa 240
agcatgtacc tacatcagat ctaaccttga tcccagcaat gtggattccc tcttctacgc 300
tgcccaggcc agccaggccc tctcaggatg tgagatctct atttcaaatg agaccaaaga 360
tctgcttctg gcagacctcg gccgcgacca                                  390
```

`<210> 277`
`<211> 378`
`<212> DNA`
`<213> Homo sapiens`

`<400> 277`

```
tgggaacttc tggggtagga cgttgtctgc tatctccagt tccacagacc caaccagtta 60
cgatggtttt ggaccatttta tgccgggatt cgacatcatt ccctataatg atctgcccgc 120
actggagcgt gctcttcagg atccaaatgt ggctgcgttc atggtagaac caattcaggg 180
tgaagcaggc gttgttgttc cggatccagg ttacctaatg ggagtgcgag agctctgcac 240
caggcaccag gttctcttta ttgctgatga aatacagaca ggattggcca gaactggtag 300
atggctggct gttgattatg aaaatgtcag acctgatata gtcctccttg gaaaggccct 360
ttctgggggc ttataccc                                              378
```

`<210> 278`
`<211> 366`
`<212> DNA`
`<213> Homo sapiens`

`<400> 278`

```
ggagggcaca ttcctttttca cctcagagtc ggtcggggaa ggccacccag ataagatttg 60
tgaccaaacc agtgatgctg tccttgatgc ccaccttcag caggatcctg atgccaaagt 120
agcttgtgaa actgttgcta aaactggaat gatccttctt gctggggaaa ttacatccag 180
agctgctgtt gactaccaga aagtggttcg tgaagctgtt aaacacattg gatatgatga 240
ttcttccaaa ggttttgact acaagacttg taacgtgctg gtagccttgg agcaacagtc 300
accagatatt gctcaaggtg ttcatcttga cagaaatgaa gaagacattg gtgctggaga 360
ccaggg                                                          366
```

`<210> 279`
`<211> 435`
`<212> DNA`
`<213> Homo sapiens`

`<400> 279`

```
cctaagaact gagacttgtg acacaaggcc aacgacctaa gattagccca gggttgtagc 60
tggaagacct acaacccaag gatggaaggc ccctgtcaca aagcctacct agatggatag 120
aggacccaag cgaaaaagat atctcaagac taacggccgg aatctggagg cccatgaccc 180
agaacccagg aaggatagaa gcttgaagac ctggggaaat cccaagatga gaaccctaaa 240
ccctacctct tttctattgt ttacacttct tactcttaga tatttccagt tctcctgttt 300
atctttaagc ctgattcttt tgagatgtac ttttttgatgt tgccggttac ctttagattg 360
acaagtatta tgcctggcca gtcttgagcc agctttaaat cacagctttt acctatttgt 420
taggctatag tgttt                                                435
```

`<210> 280`
`<211> 435`
`<212> DNA`
`<213> Homo sapiens`

```
<400> 280
tctggatgag ctgctaactg agcacaggat gacctgggac ccagcccagc caccccgaga 60
cctgactgag gccttcctgg caaagaagga gaaggccaag gggagccctg agagcagctt 120
caatgatgag aacctgcgca tagtggtggg taacctgttc cttgccggga tggtgaccac 180
ctcgaccacg ctggcctggg gcctcctgct catgatccta cacctggatg tgcagcgtga 240
gcccagacct gtccgggcgg ccgctcgaaa ttccagcaca ctggcggccg ttactagtgg 300
atccgagctc ggtaccaagc ttggcgtaat catggtcata gctgtttcct gtgtgaaatt 360
gttatccgct cacaattcca cacaacatac gagccggaag cataaagtgt aaagcctggg 420
gtgcctaatg agtga                                                 435
```

```
<210> 281
<211> 440
<212> DNA
<213> Homo sapiens
```

```
<400> 281
catctgatct ataaatgcgg tggcatcgac aaaagaacca ttgaaaaatt tgagaaggag 60
gctgctgaga tgggaaaggg ctccttcaag tatgcctggg tcttggataa actgaaagct 120
gagcgtgaac gtggtatcac cattgatatc tccttgtgga aatttgagac cagcaagtac 180
tatgtgacta tcattgatgc cccaggacac agagacttta tcaaaaacat gattacaggg 240
acatctcagg ctgactgtgc tgtcctgatt gttgctgctg gtgttggtga atttgaagct 300
ggtatctcca agaatgggca gacccgagag catgcccttc tggcttacac actgggtgtg 360
aaacaactaa ttgtcggtgt taacaaaatg gattccactg agccccctac agccagaaga 420
gatatgagga aattgttaag                                           440
```

```
<210> 282
<211> 502
<212> DNA
<213> Homo sapiens
```

```
<400> 282
tctgtggcgc aggagccccc tcccccggca gctctgacgt ctccaccgca gggactggtg 60
cttctcggag ctcccactcc tcagactccg gtggaagtga cgtggacctg gatcccactg 120
atggcaagct cttccccagc gatggttttc gtgactgcaa gaaggggat cccaagcacg 180
ggaagcggaa acgaggccgg ccccgaaagc tgagcaaaga gtactggga ctgtctcgagg 240
gcaagaagag caagcacgcg cccagaggca cccacctgtg ggagttcatc cgggacatcc 300
tcatccaccc ggagctcaac gagggcctca tgaagtggga gaatcggcat gaaggcgtct 360
tcaagttcct gcgctccgag gctgtggccc aactatgggg ccaaaagaaa aagaacagca 420
acatgaccta cgagaagctg agccgggcca tgaggtacta ctacaaacgg gagatcctgg 480
aacgggtgga tggccggcga ct                                         502
```

```
<210> 283
<211> 433
<212> DNA
<213> Homo sapiens
```

```
<220>
<221> misc_feature
<222> (1)...(433)
<223> n=A,T,C or G
```

```
<400> 283
ccatattaga ttactggaac atctaagcat cagtgtgtga ccatgcgaac aaaagacttc 60
ggggagtgtc tattttaaa aaggtttatg tgtgtcgagg cagttgtaaa agatttactg 120
```

```
cagaatcaan cccactttta ggcttangac caggttctaa ctatctaaaa atattgactg 180
ataacaaaaa gtgttctaaa tgtggctatt ctgatccata nttgnttttt aaagaaaaaa 240
antgtntata cagaaagagt ntaaaagttc tgtgaattna atgcaaatta gncnccantc 300
ttgacttccc aaanacttga ttnataccct tnactcctnt cnnttcctgn ncttcnttaa 360
nntcaatnat tnggnagtnn anggccntcn gnanaacacc nttncncgnt ccncgcaatc 420
canccgcctt nan                                                   433
```

```
<210> 284
<211> 479
<212> DNA
<213> Homo sapiens

<400> 284
tctggaagga tcagggatct gagcaaagcc aagtttactt aagctaagcc acttgttcct 60
gggtcaagca gttgtttttc taataagcat cattcctgat cattagagca aagggatgaa 120
tgctcctctt ggaatgatac aggggatctg ccactgggag agtgttgctc agtgttagag 180
tagcagcaat gacagaatga cagcgactct ctgagtcaac ccagtacttt tagtaccccg 240
tcactatgtg aataaaggca gctagaaaat ggactcaatt ctgcaagcct tcatggcaac 300
agcccatatt aagacttcta gaacaagtta aaaaaaaatc ttccatttcc atccatgcat 360
gggaaaaggg ctttagtata gtttaggatg gatgtgtgta taataataaa atgataagat 420
atgcatagtg ggggaataaa gcctcagagt ccttccagta tggggaatcc attgtatct 480
```

```
<210> 285
<211> 435
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(435)
<223> n=A,T,C or G

<400> 285
tttttttttt tttttttttt tcaatanaaa tgccataatt tattccattg tataaaaaag 60
tcatccttat gtaacaaat gtnttcttan aanaanaaat atattatttc aggtcataaa 120
taatcagcaa acatacaact gttggcaact aaaaaaaaac ccaacactgg tattttccat 180
cagngctgaa aacaaacctg cttaaanata tatttacagg gatagtncag tnctcaaaaa 240
caaaaattga ggtattttgg ttcttctagg agtagacaat gacattttgg ganggcaga 300
cccctnnccc aaaaaataaa ataagggnat nttcttcant atngaanann gggggcgccc 360
cggggaaaan naaaccttgg gnnggggtt tggcccaagc ccttgaaaaa aaantttntt 420
tcccaaaaaa aacng                                                 435
```

```
<210> 286
<211> 301
<212> DNA
<213> Homo sapiens

<400> 286
cctggtttct ggtggcctct atgaatccca tgtagggtgc agaccgtact ccatccctcc 60
ctgtgagcac cacgtcaacg gctcccggcc cccatgcacg ggggaggggag atacccccaa 120
gtgtagcaag atctgtgagc ctggctacag cccgacctac aaacaggaca agcactacgg 180
atacaattcc tacagcgtct ccaatagcga gaaggacatc atggccgaga tctacaaaaa 240
cggccccgtg gagggagctt tctctgtgta ttcggacttc ctgctctaca agtcaggagt 300
g                                                                 301
```

88

```
<210> 287
<211> 432
<212> DNA
<213> Homo sapiens

<400> 287
tccagcttgt tgccagcatg agaaccgcca ttgatgacat tgaacgccgg gactggcagg 60
atgacttcag agttgccagc caagtcagcg atgtggcggt acaggggggac ccccttctca 120
acggcaccag ctttgcagac ggcaagggac accccccagaa tggcgttcgc accaaactta 180
gatttatttt ctgttccatc catctcgatc atcagttgt caatcttctc ttgttctgtg 240
acgttcagtt tcttgctaac cagggcaggc gcaatagttt tattgatgtg ctcaacagcc 300
tttgagacac ccttcccccat atagcgagtc ttatcattgt cccggagctc tagggcctca 360
tagataccag ttgaagcacc actgggcaca gcagctctga agagacccttt tgaggtgaag 420
agatcaacct ca                                                        432


<210> 288
<211> 326
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
<222> (254)
<223> n=A,T,C or G


<400> 288
tctggctcaa gtcaaagtcc tggtcctctt ctccgcctcc ttcttcatca tagtaataaa 60
cgttgtcccg ggtgtcatcc tctgggggca gtaagggctc tttgaccacc gctctcctcc 120
gaagaaacag caagagcagc agaatcagaa ttagcaaagc aagaattcct ccaagaatcc 180
ccagaatggc aggaatttgc aatcctgctt cgacaggctg tgccttccta cagacgccgg 240
cggccccttc acantcacac acgctgacct ctaaggtggt cacttggtct ttattctggt 300
tatccatgag cttgagattg attttg                                         326


<210> 289
<211> 451
<212> DNA
<213> Homo sapiens


<400> 289
gtcccggtgt ggctgtgccg ttggtcctgt gcggtcactt agccaagatg cctgaggaaa 60
cccagaccca agaccaaccg atggaggagg aggaggttga gacgttcgcc tttcaggcag 120
aaattgccca gttgatgtca ttgatcatca atactttcta ctcgaacaaa gagatctttc 180
tgagagagct cattttcaaat tcatcagatg cattggacaa aatccggtat gaaagcttga 240
cagatcccag taaattagac tctgggaaag agctgcatat taaccttata ccgaacaaac 300
aagatcgaac tctcactatt gtggatactg gaattggaat gaccaaggct gacttgatca 360
ataaccttgg tactatcgcc aagtctggga ccaaagcgtt catggaagct ttgcaggctg 420
gtgcagatat ctctatgatt ggacctcggc c                                   451


<210> 290
<211> 494
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
```

<222> (421)
<223> n=A,T,C or G

<400> 290
ttttttttt tcaaaacagt atattttatt ttacaatagc aaccaactcc ccagtttgtt 60
tcaattgtga catctagatg gcttaagatt actttctggt ggtcacccat gctgaacaat 120
atttttcaat cttccaaaca gcaaagactc aaaagagatt ctgcatttca catcagttca 180
caagttcaag agtcttccat ttatcttagc ttttggaata aattatcttt gaggtagaag 240
gacaatgacg aagccactta attccttgtg tctgcataaa agcagattta ttcatcacaa 300
cttcatttat gtgaataaag cagatgatga taaaatgttc tcttattctt gtttaatcag 360
tagtggtagt gatgccagaa acttgtaaat gcacttcaaa ccaattgtgg ctcaagtgta 420
ngtggttccc caaggctggt accaatgaga ctggggtttg ggaattagtt ggtcatcatc 480
cctcctgctg ccca   494

<210> 291
<211> 535
<212> DNA
<213> Homo sapiens

<400> 291
tcgcgtgctt aacatgaaaa caaactttgt gctgtttggt tcattgtatg cattgatgga 60
gtcttgtctc tcatcatggg gtgtctgacc atccaacctg cagtactcat aatttctcca 120
catgcaataa tcttccaaaa tgtccaatac ccttgtcatt tgactgaaga ttagtactcg 180
tgaaccttgt tcttttaact tagggagcag cttgtctaaa accaccattt tgccactgtt 240
ggttactaga tgcatatctg ttgtataagg tggaccaggt tctgctccat caaagagata 300
tggatgatta caacattttc tcaactgcat taggatgttc aataaccctca ttttgtccat 360
cttgcctgct gagttgagta tatctatatc cttcattaat atccagtat accattccct 420
ttgcattttg ctgaggccca catagatttt tacttccttc tttggaggca aactctttc 480
aacatcagcc ttaattcgac gaaggaggaa tggacgcaaa accatatgaa gcctc 540

<210> 292
<211> 376
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(376)
<223> n=A,T,C or G

<400> 292
tacnagcccg tgctgatcga gatcctggtg gaggtgatgg atccttcctt cgtgtgcttg 60
aaaattggag cctgcccctc ggcccataag ccccttgttgg gaactgagaa gtgtatatgg 120
ggcccaagct actggtgcca gaacacagag acagcagccc agtgcaatgc tgtcgagcat 180
tgcaaacgcc atgtgtggaa ctaggaggag gaatattcca tcttggcaga aaccacagca 240
ttggtttttt tctacttgtg tgtctggggg aatgaacgca cagatctgtt tgactttgtt 300
ataaaaatag ggctccccca cctcccccat ttttgtgtcc tttattgnag cattgctgtc 360
tgcaagggag cccccta   376

<210> 293
<211> 320
<212> DNA
<213> Homo sapiens

<400> 293

90

```
tcggctgctt cctggtctgg cggggatggg tttgctttgg aaatcctcta ggaggctcct 60
cctcgcatgg cctgcagtct ggcagcagcc ccgagttgtt tcctcgctga tcgatttctt 120
tcctccaggt agagttttct ttgcttatgt tgaattccat tgcctctttt ctcatcacag 180
aagtgatgtt ggaatcgttt cttttgtttg tctgatttat ggttttttta agtataaaca 240
aaagtttttt attagcattc tgaaagaagg aaagtaaaat gtacaagttt aataaaaagg 300
ggccttcccc tttagaatag                                              320
```

<210> 294
<211> 359
<212> DNA
<213> Homo sapiens

<400> 294
```
ctgtcataaa ctggtctgga gtttctgacg actccttgtt caccaaatgc accatttcct 60
gagacttgct ggcctctccg ttgagtccac ttggctttct gtcctccaca gctccattgc 120
cactgttgat cactagcttt ttcttctgcc cacaccttct tcgactgttg actgcaatgc 180
aaactgcaag aatcaaagcc aaggccaaga gggatgccaa gatgatcagc cattctggaa 240
tttggggtgt ccttatagga ccagaggttg tgtttgctcc accttcttga ctcccatgtg 300
agtgtccatc tgattcagat ccatgagtgg tatgggaccc cccactgggg tggaatgtg 360
```

<210> 295
<211> 584
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (558)
<223> n=A,T,C or G

<400> 295
```
cctgagttgg gctgactgcc agagacagac ccctctgggt ctcggtgaac cagccaggca 60
tttacctcag tggttggcac ctggaacctg tccagggccc tcacctgact gaggagccgc 120
cgggcagtga agtaattgtc caggtctatg ctcttggggt ggataccata gccatccaag 180
gtattcctca ggttgtggaa ctgggtctga gtataggcag aactgggccc caggatgatc 240
tcccggagtg ggggaagctg tgaggtcagg taagtatcca cgtccacccg taccccaatc 300
aaactcagca gaatggtgaa ctggagaagt ccttccgtta agtatttctt cagagaaagc 360
attgctgaag gaccagaatg tttatgcttt ttggtttttta aaatcttcca aaagacaaat 420
caaggccact gctctgccgc tccagccagc aggttaccct cctcagtgtc aaaccccgta 480
ccccaccctg gcagaacaca agggatgagc tccctgacgg ccccagagga aagcacaccc 540
tgtggagcca aggccaanga cacactccag accacattca cttt              584
```

<210> 296
<211> 287
<212> DNA
<213> Homo sapiens

<400> 296
```
ccttatcatt cattcttagc tcttaattgt tcattttgag ctgaaatgct gcattttaat 60
tttaaccaaa acatgtctcc tatcctggtt tttgtagcct tcctccacat cctttctaaa 120
caagatttta aagacatgta ggtgtttgtt catctgtaac tctaaaagat cctttttaaa 180
ttcagtccta agaaagagga gtgcttgtcc cctaagagtg tttaatggca aggcagccct 240
gtctgaagga cacttcctgc ctaagggaga gtggtatttg cagacta              287
```

<210> 297

```
<211> 457
<212> DNA
<213> Homo sapiens

<400> 297
ccaattgaaa caaacagttc tgagaccgtt cttccaccac tgattaagag tggggtggca 60
ggtattaggg ataatattca tttagccttc tgagctttct gggcagactt ggtgaccttg 120
ccagctccag cagccttctt gtccactgct ttgatgacac ccaccgcaac tgtctgtctc 180
atatcacgaa cagcaaagcg acccaaaggt ggatagtctg agaagctctc aacacacatg 240
ggcttgccag gaaccatatc aacaatggca gcatcaccag acttcaagaa tttagggcca 300
tcttccagct ttttaccaga acggcgatca atcttttcct tcagctcagc aaacttgcat 360
gcaatgtgag ccgtgtggca atccaataca ggggcatagc cggcgcttat ttggcctgga 420
tggttcagga taatcacctg agcagtgaag ccagacc                         457

<210> 298
<211> 469
<212> DNA
<213> Homo sapiens

<400> 298
tctttgactt tccttgtcta cctcctctgg agatctcaaa ttctccaggt tccatgctcc 60
cagagatctc aatgattcct gattctcctc ttccaggagt ctgaatgtct cttggttcac 120
ttccacagac tccagtggtt cttgaatttc cttttctaga ggattcattg ccccctgatt 180
tatttcttct ggagtccaca gtggtgcttg agtttctgga gatttcagtg tttccaggtt 240
ctcttgtccc gcagacttca gtgattctag gatctctgtt tctaaagatt ttactgcctc 300
tatgctctct tctttgagtg actttaagaa ctcttgattc tcattttcaa gaggtctagc 360
tatctcctgg tcaagagact tcagtggttc tagatccact ttttctgggg gtcttaatgt 420
catctgatcc tgttcccta gagacctccg tcgctgttga gtctctttt                469

<210> 299
<211> 165
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(165)
<223> n=A,T,C or G

<400> 299
tctgtggaga ggatgaggtt gagggaggtg gggtatntcg ctgctctgac cttaggtaga 60
gtcctccaca gaagcatcaa antggactgg cacatatgga ctcccttcac aggccacaat 120
gatgtgtctc tccttcgggc tggnccggta tgcacagttg gggta                165

<210> 300
<211> 506
<212> DNA
<213> Homo sapiens

<400> 300
tctgaggaaa gtttgggctt attagtattt gctccagcga acctccaagt tttctccatt 60
gcggacaacg taactaccag ctccttggct cagtggttcg cctccactca gaagttccca 120
gtaggttctg tcattattgt tggcacatag gccctgaata caggtgatat agggccccca 180
tgagcgctcc tccattgtga aaccaaatat agtatcattc attttctggg ctttctccat 240
cacactgagg aagacagaac catttagcac agtgacattg gtgaaatatg tttcattgat 300
```

```
tctcacagag taattgacgg agatatatga ttgtgagtca ggaggtgtca cagttatagg 360
ctcatcagcg gagatgttga agttacctga agcagagacg caagaagagt ctttgttaat 420
atccaagaag gtctttccca tcagggcagg taagacctgg gctgcagcgt ttggattgct 480
gaatgctcct tgagaaattt ccgtga                                      506
```

```
<210> 301
<211> 304
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(304)
<223> n=A,T,C or G

<400> 301
tcctaaggca gagcccccat cacctcaggc ttctcagttc ccttagccgt cttactcaac 60
tgcccctttc ctctccctca gaatttgtgt ttgctgcctc tatcttgttt tttgtttttt 120
cttctggggg gggtctagaa cagtgcctgg cacatagtag gcgctcaata aatacttgtt 180
tgttgaatgt ctcctctctc tttccactct gggaaaccta ngnttctgcc attctgggtg 240
accctgtatt tntttctggt gcccattcca tttgnccagn taatacttcc tcttaaaaat 300
ctcc                                                              304
```

```
<210> 302
<211> 492
<212> DNA
<213> Homo sapiens

<400> 302
ttttcagtaa gcaacttttc catgctctta atgtattcct ttttagtagg aatccggaag 60
tattagattg aatggaaaag cacttgccat ctctgtctag gggtcacaaa ttgaaatggc 120
tcctgtatca catacggagg tcttgtgtat ctgtggcaac agggagtttc cttattcact 180
ctttatttgc tgctgtttaa gttgccaacc tcccctccca ataaaaattc acttacacct 240
cctgcctttg tagttctggt attcacttta ctatgtgata gaagtagcat gttgctgcca 300
gaatacaagc attgcttttg gcaaattaaa gtgcatgtca tttcttaata cactagaaag 360
gggaaataaa ttaaagtaca caagtccaag tctaaaactt tagtactttt ccatgcagat 420
ttgtgcacat gtgagagggt gtccagtttg tctagtgatt gttatttaga gagttggacc 480
actattgtgt gt                                                     492
```

```
<210> 303
<211> 470
<212> DNA
<213> Homo sapiens

<400> 303
tctggggcag caggtactcc ctacggcact agtctacagg gggaaggacg ctctgtgctg 60
gcagcggtgg ctcacatggc ctgtctgcac tgtaaccaca ggctgggatg tagccaggac 120
ttggtctcct tggaagacag gtctgatgtt tggccaatcc agtccttcag accctgcctg 180
aaacttgtat cttacgtgaa cttaaagaat aaaatgcatt tctaccccga tctcgccccc 240
aggactggca cgacaggccc acggcagatt agatcttttc ccagtactga tcggtgcgtg 300
gaattccagc caccacttct gattcgattc cacagtgatc ctgtcctctg agtattttaa 360
agaagccatt gtcaccccag tcagtgttcc aggagttggc aaccagccag tagggtgtgc 420
cattctccac tccccagccc aggatgcgga tggcatggac ctcggccgcg             470
```

```
<210> 304
```

93

```
<211> 79
<212> DNA
<213> Homo sapiens

<400> 304
tgtcccattg ttaactcagc ctcaaatctc aactgtcagg ccctacaaag aaaatggaga 60
gcctcttctg gtggatgcg                                                79


<210> 305
<211> 476
<212> DNA
<213> Homo sapiens

<400> 305
tcactgagcc accctacagc cagaagagat atgaggaaat tgttaaggaa gtcagcactt 60
acattaagaa aattggctac aaccccgaca cagtagcatt tgtgccaatt tctggttgga 120
atggtgacaa catgctggag ccaagtgcta acgtaagtgg ctttcaagac cattgttaaa 180.
aagctctggg aatggcgatt tcatgcttac acaaattggc atgcttgtgt ttcagatgcc 240
ttggttcaag ggatggaaag tcacccgtaa ggatggcaat gccagtggaa ccacgctgct 300
tgaggctctg gactgcatcc taccaccaac tcgtccaact gacaagccct gcgcctgcc 360
tctccaggat gtctacaaaa ttggtggtaa gttggctgta aacaaagttg aatttgagtt 420
gatagagtac tgtctgcctt cataggtatt tagtatgctg taaatatttt taggta 480


<210> 306
<211> 404
<212> DNA
<213> Homo sapiens

<400> 306
tctgtctcgg agctcagggc gcagccagca cacacaggag cccacaggac agccacgtct 60
tcacagaaac tacagaagtc aggacccagg cgaggacctc aggaacaagt gcccctgca 120
gacagagaga cgcagtagca acagcttctg aacaactaca taataatgcg gggagaatcc 180
tgaagaccac tgcatcccac aagcactgac aaccacttca ggattttatt tcctccactc 240
taacccccag atccatttat gagaagtgag tgaggatggc aggggcatgg agggtgaagg 300
gacagcaagg atggtctgag ggcctggaaa caatagaaaa tcttcgtcct ttagcatatc 360
ctggactaga aaacaagagt tggagaagag gggggttgat acta                404


<210> 307
<211> 260
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
<222> (1)...(260)
<223> n=A,T,C or G


<400> 307
tcctgcctan acatctgtga gggcctcaag ggctgctgcc tcgactttct ccctagctaa 60
gtccaccgt ccagggacac agccagggca ctgctctgtg ctgacttcca ctgcagccaa 120
gggtcaaaat gaagcatctg cggaggccag gactccttgg catcggacac agtcagggga 180
aaagccaccc tgactctgca ggacagaggg tctagggtca tttggcagga gaacactggt 240
gtgccaaggg aagcnancat                                               260


<210> 308
```

94

```
<211> 449
<212> DNA
<213> Homo sapiens

<400> 308
tctgtgctcc cgactcctcc atctcaggta ccaccgactg cactgggcgg ggccctctgg 60
ggggaaaggc tccacggggc agggatacat ctcgaggcca gtcatcctct ggaggcagcc 120
caatcaggtc aaagattttg cccaactggt cggcttcaga gtttccacag aagagaggct 180
ttcgacgaaa catctctgca aagatacagc caacactcca catgtccaca ggtgttgcat 240
atgtggactg cagaagaact tcgggagctc ggtaccagag tgtaacaacc ttgatcgttt 300
cggctggcaa gcctggtggg ggtgccttgt ccagatatgt ccttaggtcc tggtctacat 360
gctcaaacac cagggttacc ttgatctccc ggtcagttcg ggatgtggca cagacgtcca 420
tcagccggac aacattggga tgctcaaaa                                      449

<210> 309
<211> 411
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (384)
<223> n=A,T,C or G

<400> 309
ctgtggaaac ctggggtgcc gggtaaatgg agaactccag cttggatttc ttgccataat 60
caactgagag acgttccatg agcagggagg tgaacccaga accagttccc ccaccaaagc 120
tgtggaaaac caagaagccc tgaagaccgg tgcactggtc agccagcttg cgaattcggt 180
ccaacacaag gtcaatgatc tccttgccaa tggtgtagtg ccctcgggca tagttattgg 240
cagcatcttc cttgcctgtg atgagctgct cagggtggaa gagctggcgg taggtgccag 300
tgcgaacttc atcaatgact gtgggttcca agtctacaaa cacagcccgg ggcacgtgct 360
tgccagcgcc cgtctcactt gaanaagggt gtttgaagga agtcatctcc t 420

<210> 310
<211> 320
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (250)
<223> n=A,T,C or G

<400> 310
tcctcgtcca gcttgactcg attagtcctc ataaggtaag caaggcagat ggtggctgac 60
cgggaaatgc ctgcctggca gtggacaaac acccttcctc cagcattctt gatggagtct 120
atgaagtcaa tggcctcgtt gaaccaggag ctgatgtctg ccttgtggtt gtcctccaca 180
gggatgctct tgtactggta gtgaccctca aaatggttgg gacaattggc tgagacgttg 240
atcaaggcan ttatgcccaa ggcatccagc atgtccttgc gggaagcgtg atacgcactg 300
cccaggtaca gaaagggcag                                               320

<210> 311
<211> 539
<212> DNA
<213> Homo sapiens
```

<400> 311
tctggcccat gaagctgaag ttgggagaga tgatgcttcg cctctgcttc acaaactcaa 60
aggcctcgtc cagcttgact cgattagtcc tcataaggta agcaaggcag atggtggctg 120
accgggaaat gcctgcctgg cagtggacaa acacccttcc tccagcattc ttgatggagt 180
ctatgaagtc aatggcctcg ttgaaccagg agctgatgtc tgccttgtgg ttgtcctcca 240
cagggatgct cttgtactgg tagtgaccct caaaatggtt gggacaattg gctgagacgt 300
tgatcaaggc agttatgccc aaggcatcca gcatgtcctt gcgggaagcg tgatacgcac 360
tgcccaggta cagaaagggc aggatttcca ccgggccacc ctgaaatcca gaaatatcca 420
acattcatca agcttgctca aagccaaggc cagtgcccat acccacaaaa actttctgct 480
ggaaaagtca atttcagata ccgagtgaac tcagttctgt tgctggagga taaataaat 540

<210> 312
<211> 475
<212> DNA
<213> Homo sapiens

<400> 312
tcaaggatct tcctaaagcc accatgtgag aggattcgga cgagagtctg agctgtatgg 60
cagaccatgt cctgctgttc tagggtcatg actgtgtgta ctctaaagtt gccactctca 120
caggggtcag tgatacccac tgaacctggc aggaacagtc ctgcagccag aatctgcaag 180
cagcgcctgt atgcaacgtt tagggccaaa ggctgtctgg tggggttgtt catcacagca 240
taatggccta gtaggtcaag gatccagggt gtgaggggct caaagccagg aaaacgaatc 300
ctcaagtcct tcagtagtct gatgagaact ttaactgtgg actgagaagc attttcctcg 360
aaccagcggg catgtcggat ggctgctaag gcactctgca atactttgat atccaaatgg 420
agttctggat ccagttttcg aagattgggt ggcactgttg taatgagaat cttca 480

<210> 313
<211> 456
<212> DNA
<213> Homo sapiens

<400> 313
tccacttaaa gggtgcctct gccaactggt ggaatcatcg ccacttccag caccacgcca 60
agcctaacat cttccacaag gatcccgatg tgaacatgct gcacgtgttt gttctgggcg 120
aatggcagcc catcgagtac ggcaagaaga agctgaaata cctgccctac aatcaccagc 180
acgaatactt cttcctgatt gggccgccgc tgctcatccc catgtatttc cagtaccaga 240
tcatcatgac catgatcgtc cataagaact gggtggacct ggcctgggcc gtcagctact 300
acatccggtt cttcatcacc tacatccctt ctacggcat cctgggagcc tcccttttcc 360
tcaacttcat caggttcctg gagagccact ggtttgtgtg ggtcacacag atgaatcaca 420
tcgtcatgga gattgaccag gaggacctcg gcccgc   456

<210> 314
<211> 477
<212> DNA
<213> Homo sapiens

<400> 314
tgcgtgggct tctggaagcc tggatctgga atcattcacc agattattct ggaaaactat 60
gcgtaccctg gtgttcttct gattggcact gactcccaca ccccaatgg tggcggcctt 120
gggggcatct gcattggagt tggggggtgcc gatgctgtgg atgtcatggc tgggatcccc 180
tgggagctga agtgccccaa ggtgattggc gtgaagctga cgggctctct ctccggttgg 240
tcctcaccca aagatgtgat cctgaaggtg gcaggcatcc tcacggtgaa aggtggcaca 300
ggtgcaatcg tggaatacca cgggcctggt gtagactcca tctcctgcac tggcatggcg 360
acaatctgca acatgggtgc agaaattggg gccaccactt ccgtgttccc ttacaaccac 420

96

```
aggatgaaga agtatctgag caagaccggc cgggaagaca ttgccaatct agctgat    477
```

<210> 315
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 315
```
caggtactgg atgtcaggtc tgcgaaactt cttanatttt gacctcagtc cataaaccac 60
actatcacct cggccatcat atgtgtctac tgtggggaca actggagtga aaacttcggt 120
tgctgcaggt ccgtgggaaa atcagtgacc agttcatcag attcatcaga atggtgagac 180
tcatcagact ggtgagaatc atcagtgtca tctacatcat cagagtcgtt cgagtcaatg 240
g                                                                241
```

<210> 316
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 316
```
nttntgtgat agtgtggttt atggactgag gncaaaatnt aagaagtttc gcagacctga 60
catccaancc tgcccgngcg gncgctcgaa aggncgaatt ctgcagatat ccatcacact 120
ggcggccgct cgagcatgca tctagagggc ccaattcgcc ctatantgag tnatattaca 180
attcactggc cgtcnnttta caacgtcgtg actgggaaaa ccctggcgtt acccaactta 240
a                                                                241
```

<210> 317
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 317
```
aggtaccctg ctcancagcc tgggngcctg ggttgtctcc ttgtccatcc actggtccat 60
tctgctctgc atttttttgt tcctcttttg gaggttccac tttgggtttg ggctttgaaa 120
ttatagggct acaantacct cggccgaaac cacnctaagg gcgaattctg cagatatcca 180
tcacactggc ggncgctcga gcatgcatct agagggccca attcgcccta tagtgagtcg 240
t                                                                241
```

<210> 318
<211> 241
```

97

<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 318
cgngnacaan ntacattgat gganggtntg nggntctgan tntttantta cantggagca  60
ttaatatttt cttnaacgtn cctcaccttc ctgaantaaa nactctgggt tgtagcgctc  120
tgtgctnana accacntnaa ctttacatcc ctcttttgga ttaatccact gcgcggccac  180
ctctgccgcg accacgctaa gggcnaattc tgcagatatc catcacactg gcggccgctc  240
n                                                                   241

<210> 319
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 319
caggtactga tcggtgcgtg gaantccagc caccanttnt gattcgattc cacagtgatc  60
ctgtcctctg agtattttaa agaagccatt gtcaccccag tcagtgttcc aggagttggc  120
aaccagccag tagggtgtgc cattctccac tccccagccc aggatgcgga tggcatggcc  180
acccatcatc tctccggtga cgtgttggta cctcggccgc gaccacgcta agggcgaatt  240
c                                                                   241

<210> 320
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 320
ggcaggtacc aacagagctt agtaatntct aaaaagaaaa aatgatcttt ttccgacttc  60
taaacaagtg actatactag cataaatcat tctagtaaaa cagctaaggt atagacattc  120
taataatttg ggaaaaccta tgattacaag tgaaaactca gaaatgcaaa gatgttggtt  180
ttttgtttct cagtctgctt tagcttttaa ctctnnnaan cncatgcaca cttgnaactc  240
t                                                                   241

<210> 321
<211> 241
<212> DNA
<213> Homo sapiens

<220>

98

<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 321
angtaccaac agagcttagt aattnntaaa aagaaaaaat gatcttttc cgacttctaa 60
acaagtgact atactagcat aaatcattct agtaaaacag ctaaggtata gacattctaa 120
taatttggga aaacctatga ttacaagtga aaactcagaa atgcaaagat gttggttttt 180
tgtttctcag tctgctttag cttttaactc tggaagcgca tgcacacntg aactctgctc 240
a                                                              241

<210> 322
<211> 241
<212> DNA
<213> Homo sapiens

<400> 322
ggtaccaaca gagcttagta atttctaaaa agaaaaaatg atctttttcc gacttctaaa 60
caagtgacta tactagcata aatcattctt ctagtaaaac agctaaggta tagacattct 120
aataatttgg gaaaacctat gattacaagt aaaaactcag aaatgcaaag atgttggttt 180
tttgtttctc agtctgcttt agcttttaac tctggaagcg catgcacact gaactctgct 240
c                                                              241

<210> 323
<211> 241
<212> DNA
<213> Homo sapiens

<400> 323
cgaggtactg tcgtatcctc agccttgttc tatttctta ttttagcttt acagagatta 60
ggtctcaagt tatgagaatc tccatggctt tcaggggcta aactttctg ccattcttt 120
gctcttaccg ggctcagaag gacatgtcag gtgggatacg tgtttctctt tcagagctga 180
agaaagggtc tgagctgcgg aatcagtaga gaaagccttg gtctcagtga ctccttggct 240
t                                                              241

<210> 324
<211> 241
<212> DNA
<213> Homo sapiens

<400> 324
aggtactgtc gtatcctcag ccttgttcta tttctttatt ttagctttac agagattagg 60
tctcaagtta tgagaatctc catggctttc aggggctaaa cttttctgcc attcttttgc 120
tcttaccggg ctcagaagga catgtcaggt gggatacgtg tttctctttc agagctgaag 180
aaagggtctg agctgcggaa tcagtagaga aagccttggt ctcagtgact ccttggcttt 240
c                                                              241

<210> 325
<211> 241
<212> DNA
<213> Homo sapiens

<400> 325
ggcaggtaca tttgttttgc ccagccatca ctcttttttg tgaggagcct aaatacattc 60
ttcctggggt ccagagtccc cattcaaggc agtcaagtta agacactaac ttggcccttt 120

99

```
cctgatggaa atatttcctc catagcagaa gttgtgttct gacaagactg agagagttac 180
atgttgggaa aaaaaaagaa gcattaactt agtagaactg aaccaggagc attaagttct 240
g                                                                241
```

```
<210> 326
<211> 241
<212> DNA
<213> Homo sapiens
```

```
<400> 326
gcaggtacat ttgttttgcc cagccatcac tcttttttgt gaggagccta aatacattct 60
tcctggggtc cagagtcccc attcaaggca gtcaagttaa gacactaact tggcccttc 120
ctgatggaaa tatttcctcc atagcagaag ttgtgttctg acaagactga gagagttaca 180
tgttgggaaa aaaaagaagc attaacttag tagaactgat ccaggagcat taagttctga 240
a                                                                241
```

```
<210> 327
<211> 241
<212> DNA
<213> Homo sapiens
```

```
<400> 327
ggtaccagac caagtgaatg cgacagggaa ttatttcctg tgttgataat tcatgaagta 60
gaacagtata atcaaaatca attgtatcat cattagtttt ccactgcctc acactagtga 120
gctgtgccaa gtagtagtgt gacacctgtg ttgtcatttc ccacatcacg taagagcttc 180
caaggaaagc caaatcccag atgagtctca gagagggatc aatatgtcca tgattatcag 240
g                                                                241
```

```
<210> 328
<211> 241
<212> DNA
<213> Homo sapiens
```

```
<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G
```

```
<400> 328
ggtacnagac caaatgaang ccacagggaa ttatttcctg tgttgataat tcatgaagta 60
gaacantata atcaaaatca attgtatcat cattagtttt ccactgcctc acactagtga 120
gctgtgccaa gtagtagtgt gacacctgtg ttgtcatttc ccacatcacg taagagcttc 180
caaggaaagc caaatcccag atgagtctca gagagggatc aatatgtcca tnatcatcan 240
g                                                                241
```

```
<210> 329
<211> 241
<212> DNA
<213> Homo sapiens
```

```
<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G
```

100

```
<400> 329
ttcaggtcga gttggctgca gatttgtggt gcnttctgag ccgtctgtcc tgcgccaaaa 60
ngcttcaaag tattattaaa aacatatgga tccccatgaa gccctactac accaaagttt 120
accaggagat ttggatagga atggggctga tgggcttcat cgtttataaa atccgggctg 180
ctgataagaa gtaaggcttt gaaagcttca gcgcctgctn ctggtcanna ctaaccatan 240
n                                                                 241


<210> 330
<211> 241
<212> DNA
<213> Homo sapiens


<400> 330
ttttgtgcag atttgtggtg cgttctgagc cgtctgtcct gcgccaagat gcttcaaagt 60
attattaaaa acatatggat ccccatgaag ccctactaca ccaaagttta ccaggagatt 120
tggataggaa tggggctgat gggcttcatc gtttataaaa tccgggctgc tgataaaaga 180
agtaaggctt tgaaagcttc agcgcctgct cctggtcatc actaaccaga tttacttgga 240
g                                                                 241


<210> 331
<211> 241
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G


<400> 331
nttttaggna ctttgggctc cagacttcac tggtcttagg nattgaaacc atcacctggn 60
ntgcattcct catgactgag gttaacttaa aacaaaaatg gtaggaaagc tttcctatnc 120
ttcnggtaag anacaaatnt nctttaaaaa aangtggaag gcatgacnta cgtgagaact 180
gcacaaactg gccactgaca aaaatgaccc ccatttgtgt gacttcattg agacacatta 240
c                                                                 241


<210> 332
<211> 241
<212> DNA
<213> Homo sapiens


<400> 332
tgtgaggaga gggaacatgc tgagaaactg atgaagctgc agaaccaacg aggtggccga 60
atcttccttc aggatatcaa gaaaccagac tgtgatgact gggagagcgg gctgaatgca 120
atggagtgtg cattcacatt tggaaaaaaat gtgaatcagt cactactgga actgcacaaa 180
ctggccactg acaaaaatga ccccccatttg tgtgacttca ttgagacaca ttacctgaat 240
g                                                                 241


<210> 333
<211> 241
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
```

```
<222> (1)...(241)
<223> n = A,T,C or G

<400> 333
caggtacaag cttttttttt tttttttttt tttttttttt ttgnaaatac tntttattgn 60
aaatattcta tcctaaattc catatagcca attaattntt acanaatntt ttgttaattt 120
ttgngngtat aaattttaca aaaataaagg gtatgtttgt tgcacacaac ttacaaataa 180
taataaactn tttattgnaa atattnttta ttgnaaatat tctttatcct aaattccata 240
t                                                                 241


<210> 334
<211> 241
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G


<400> 334
tacctgctgn aggggntgaa gncntctctg ctgccccagg catctgcanc ccctgctgct 60
ggttctgccc ctgctgcagc agaggagaag aaagatgaga agaaggagga gtctgaagag 120
tcagatgatg acatgggatt tggccttttt gattaaannc ctgctccct gcaaataaag 180
cctttttaca caaaaaaaaa aaaaaaaaaa aaaaaaaaaa aagcttgtac ctgcccnggc 240
g                                                                 241


<210> 335
<211> 241
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G


<400> 335
ctatgtgctg ggatgactat ggagacccaa atgtctcana atgtatgtcc cagaaacctg 60
tggctgcttc aaccattgac agttttgctg ctgctggctt ctgcagacag tcaagctgca 120
gctcccccaa aggctgtgct gaaacttgag cccccgtgga tcaacgtgct ccaggaggac 180
tctgtgactc tgacatgcca gggggctcgc agccctgaga gcgactccat tcagtggttc 240
c                                                                 241


<210> 336
<211> 241
<212> DNA
<213> Homo sapiens


<400> 336
taccaaccta tgcagccaag caacctcagc agttccatc aaggccacct ccaccacaac 60
cgaaagtatc atctcaggga aacttaattc ctgccgtcc tgctcctgca cctcctttat 120
atagttccct cacttgattt ttttaacctt cttttttgcaa atgtcttcag ggaactgagc 180
taatactttt tttttttcttg atgttttctt gaaaagcctt tctgttgcaa ctatgaatga 240
a                                                                 241
```

```
<210> 337
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 337
ggtactgtat gtagctgcac tacaacagat tcttaccgtc tccacanagg tcatanattg 60
taaatggtna atactgactt ttttttattt cccttgactc aagacagcta acttcatttt 120
cagaactgtt ttaaaccttt gtgtgctggt ttataaaata atgtgtgtaa tccttgttgc 180
tttcctgata ccagactgtt tcccgtggtt ggttagaata tattttgntt tgatgcttat 240
a                                                              241


<210> 338
<211> 241
<212> DNA
<213> Homo sapiens

<400> 338
aggtacaggt gtgcgctgag ccgagtttac acggaaagga taaagcccat ttagtttctt 60
ctcaaatgga gttttccact ttcctttgaa gtagacagca ttcaccagga tcatcctggt 120
atccccatct acagaacctt caggtaacaa gtttgggatt ttgcctttgg tttgagtctt 180
gacccaggaa ttaatctttt ttctagcttc ttctgcacat tctaggaagt ctactgcctg 240
g                                                              241


<210> 339
<211> 241
<212> DNA
<213> Homo sapiens

<400> 339
taccgacggc tcctggaggg agagagtgaa gggacacggg aagaatcaaa gtcgagcatg 60
aaagtgtctg caactccaaa gatcaaggcc ataacccagg agaccatcaa cggaagatta 120
gttctttgtc aagtgaatga aatccaaaag cacgcatgag accaatgaaa gtttccgcct 180
gttgtaaaat ctattttccc ccaaggaaag tccttgcaca gacaccagtg agtgagttct 240
a                                                              241


<210> 340
<211> 241
<212> DNA
<213> Homo sapiens

<400> 340
gtagccctca cacacacatg cccgtaacag gatttatcac aagacacgcc tgcatgtaga 60
ccagacacag ggcgtatgga aagcacgtcc tcaagactgt agtattccag atgagctgca 120
gatgcttacc taccacggcc gtctccacca gaaaaccatc gccaactcct gcgatcagct 180
tgtgacttac aaaccttgtt taaaagctgc ttacatggac ttctgtcctt taaaagcttc 240
c                                                              241


<210> 341
```

```
<211> 241
<212> DNA
<213> Homo sapiens

<400> 341
gtaccgccta ctttcgtctc atgtctccga acttcttgct gatggccgtt ccaacgttgc 60
tgaaagctgc agttgccttt tgccctgcgt gactcagggt ttcatgtgtt ttcttgtagg 120
cagtggtagt ctgcatgtca tgccagcttt tgctgaagtt ctgttttaat tcattcatca 180
ggttcatgcc gagttttgtt ttatctcaac tagatgcctt tctttcgctg acaaaacttg 240
t                                                                  241


<210> 342
<211> 241
<212> DNA
<213> Homo sapiens

<400> 342
gtacattggt gctataaata taaatgctac ttatgaagca tgaaattaag cttctttttt 60
cttcaagttt tttctcttgt ctagcaatct gttaggcttc tgaaccaaga ccaaatgttt 120
acgttcctct gctgcatacc aacgttactc caaacaataa aaatctatca tttctgctct 180
gtgctgagga atggaaaatg aaaccccac cccctgaccc ctaggactat acagtggaaa 240
c                                                                  241


<210> 343
<211> 241
<212> DNA
<213> Homo sapiens

<400> 343
gtacatgtgg tagcagtaat tttttgaag caactgcact gacattcatt tgagttttct 60
ctcattatca gattctgttc caaacaagta ttctgtagat ccaaatggat taccagtgtg 120
ctacagactt cttattatag aacagcattc tattctacat caaaaatagt ttgtgtaagt 180
tagttttggt taccatctaa aatattttta aatgttcttt acataaaaat ttatgttgtg 240
t                                                                  241


<210> 344
<211> 241
<212> DNA
<213> Homo sapiens

<400> 344
ggtacaaaat tgttggaatt tagctaatag aaaaacatag taaatattta caaaaacgtt 60
gataacatta ctcaagtcac acacatataa caatgtagac aggtcttaac aaagtttaca 120
aattgaaatt atggagattt cccaaaatga atctaatagc tcattgctga gcatggttat 180
caatataaca tttaagatct tggatcaaat gttgtccccg agtcttctgc aatccagtcc 240
t                                                                  241


<210> 345
<211> 241
<212> DNA
<213> Homo sapiens

<400> 345
ggtacgaagc tgagcgcacg ggggttgccc cagcgtggag cctggacctc aaacttcacg 60
gaaaatgctc tctctctttg acaggcttcc agctgtctcc taatttcctg gatgaactct 120
```

104

```
ccccggcgat ttaactgatc ctgaaaagtg gtgagaggac tgaggaagac aaccaggtca 180
gcgttagatc ggcctctgag ggtggtgccc ttgcctgagg agccacccct taccaccttg 240
g                                                                  241
```

<210> 346
<211> 241
<212> DNA
<213> Homo sapiens

<400> 346
```
caggtaccac tgagcctgag atggggatga gggcagagag aggggagccc cctcttccac 60
tcagttgttc ctactcagac tgttgcactc taaacctagg gaggttgaag aatgagaccc 120
ttaggtttta acacgaatcc tgacaccacc atctataggg tcccaacttg gttattgtag 180
gcaaccttcc ctctctcctt ggtgaagaac atcccaagcc agaaagaagt taactacagt 240
g                                                                  241
```

<210> 347
<211> 241
<212> DNA
<213> Homo sapiens

<400> 347
```
aggtacatct aaaggcatga agcactcaat tgggcaatta acattagtgt ttgttctctg 60
atggtatctc tgagaatact ggttgtagga ctggccagta gtgccttcgg gactgggttc 120
accccaggt ctgcggcagt tgtcacagcg ccagccccgc tggcctccaa agcatgtgca 180
ggagcaaatg gcaccgagat attccttctg ccactgttct cctacgtggt atgtcttccc 240
a                                                                  241
```

<210> 348
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 348
```
angtacttgg caagattnga tgctcttgng ctcantgaca tcattcataa cttgtnngtg 60
tgancagagg aggagnncat catcntgtcc tcattcgtca gnnncctctc ctctctgaat 120
ctcaaacaag ttgataatgg agaaaaattt gaattctcag gattgaggct ggactggttc 180
cgcctacang catacactag cgtggctaag gcccctctgc accctgcatg anaaccctga 240
c                                                                  241
```

<210> 349
<211> 241
<212> DNA
<213> Homo sapiens

<400> 349
```
gcaggtacca tttgtctgac ctctgtaaaa aatgtgatcc tacagaagtg gagctggata 60
atcagatagt tactgctacc cagagcaata tctgtgatga agacagtgct acagagacct 120
gctacactta tgacagaaac aagtgctaca cagctgtggt cccactcgta tatggtggtg 180
agaccaaaat ggtggaaaca gccttaaccc cagatgcctg ctatcctgac taatttaagt 240
```

105

```
c                                                           241

<210> 350
<211> 241
<212> DNA
<213> Homo sapiens

<400> 350
aggtactgtg gatatttaaa atatcacagt aacaagatca tgcttgttcc tacagtattg 60
cgggccagac acttaagtga aagcagaagt gtttgggtga cttttcctact taaaattttg 120
gtcatatcat ttcaaaacat ttgcatcttg gttggctgca tatgctttcc tattgatccc 180
aaaccaaatc ttagaatcac ttcatttaaa atactgagcg gtattgaata cttcgaagca 240
g                                                           241

<210> 351
<211> 241
<212> DNA
<213> Homo sapiens

<400> 351
tacagaaatc atttggagcc gttttgagac agaagtagag gctctgtcaa gtcaatactg 60
cattgcagct tggtccactg aagaagccac gcctgagata caaaagatgc actacacttg 120
acccgcttta tgttcgcttc ctctcccctt ctctctcatc aactttatta ggttaaaaca 180
ccacatacag gctttctcca aatgactccc tatgtctggg gtttggttag aattttatgc 240
c                                                           241

<210> 352
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 352
gtaccctgtn gagctgcacc aagattannt ggggccatca tgactgcanc cacnacgang 60
acgcaggcgt gnagtgcatc gtctgacccg gaaacccttt cacttctctg ctcccgaggt 120
gtcctcnggc tcatatgtgg gaaggcanan gatctctgan gagttncctg gggacaactg 180
ancagcctct ggagaggggc cattaataaa gctcaacatc attggcaaaa aaaaaaaaaa 240
a                                                           241

<210> 353
<211> 241
<212> DNA
<213> Homo sapiens

<400> 353
aggtaccagt gcattaattt gggcaaggaa agtgtcataa tttgatactg tatctgtttt 60
ccttcaaagt atagagcttt tggggaagga aagtattgaa ctgggggttg gtctggccta 120
ctgggctgac attaactaca attatgggaa atgcaaaagt tgtttggata tggtagtgtg 180
tggttctctt ttggaatttt tttcaggtga tttaataata atttaaaact actataaaaa 240
c                                                           241
```

106

```
<210> 354
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 354
ngcaggtccg ggcaggtacc aagattcatt ctcatcaaaa actagaaaca gaagggcaaa   60
ttccagtttc cttctgggat tgaatacttt caagtaaggt cttcgacaaa caatcagggg  120
gccaattaat ccactgtaga ggtccttaac ttgatccaca gttgaataat aagcccatgg  180
aatacaagca gaatcctctg ttccagctcc agatctttct gggattttcc atacgtaagt  240
g                                                          ·241

<210> 355
<211> 241
<212> DNA
<213> Homo sapiens

<400> 355
ggtacccacc ctaaatttga actcttatca agaggctgat gaatctgacc atcaaatagg   60
ataggatgga ccttttttttg agttcattgt ataaacaaat tttctgattt ggacttaatt  120
cccaaaggat taggtctact cctgctcatt cactctttca aagctctgtc cactctaact  180
tttctccagt gtcatagata gggaattgct cactgcgtgc ctagtctttc ttcacttacc  240
t                                                           241

<210> 356
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 356
aggtactgta attgagcatc cggaatntgg agaagtaatt tagctacagg gtgaccaacg   60
caagaacata tgccagttcc tcgtagagat tggactggct aaggacgatc agctgaaggt  120
tcatgggttt taagtgcttg tggctcactg aagcttaagt gaggatttcc ttgcaatgag  180
tagaatttcc cttctctccc ttgtcacagg tttaaaaacc tcacagcttg tataatgtaa  240
c                                                           241

<210> 357
<211> 241
<212> DNA
<213> Homo sapiens

<400> 357
ttttgtacca ccgatatgat caaggaaaat tctgcccatt tttatggctg aagttctaaa   60
aacctaattc aaagttcttc catgatccta cactgcctcc aagatggtcc aggctggcat  120
aaggcctgag cggcggtgag atccgcggct gccagcagct tgtcgctctt cagctggtat  180
```

107

```
gaagcccctc ggccacccga gtctccagga cctgcccggg cgccgctcga aagggcgaat 240
t                                                                  241
```

```
<210> 358
<211> 241
<212> DNA
<213> Homo sapiens
```

```
<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G
```

```
<400> 358
aggtacgggg agtgggggtg aagcntgttc tctacatagg caacacagcc gcctaantca 60
caaagtcagt ggtcggccgc ttcgaccaac atgtggtgag cattccacgg gcgcatgaag 120
tctgggtgct gtgctcgagt ctctgaatat tttgatagga agcgacaaga aaattcaaac 180
tgctctttgc tgactactgg aaagtgaaaa gatgctcaag tttaccattc aaagaaacca 240
t                                                                  241
```

```
<210> 359
<211> 241
<212> DNA
<213> Homo sapiens
```

```
<400> 359
gaggtacaca aaaggaatac cttctgagag ccagggagtg aggaaagggg aaggagactt 60
gacgtcaagg gtgcttttga ggaacatgac gggccagcca gcctgcccca actttgaggc 120
cctgctgggc tcttgtgact ataaatatac tgtctatttc taatgcaatc cgtctttcct 180
gaaagatctt gttatctttt actattgaga catgctttca tttttgtggt cctgtttcca 240
a                                                                  241
```

```
<210> 360
<211> 241
<212> DNA
<213> Homo sapiens
```

```
<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G
```

```
<400> 360
ngtactctat actaattctg ccttttata cttaattcta aatttctccc ctctaattta 60
caacaaattt tgtgattttt ataagaatct atgcctcccc aattctcaga ttcttctctt 120
ttctccttta tttctttgct taaattcagt ataagctttc ttggtatttt aggcttcatg 180
cacattctta ttcctaaaca ccagcagttc ttcagagacc taaaatccag tataggaata 240
a                                                                  241
```

```
<210> 361
<211> 241
<212> DNA
<213> Homo sapiens
```

```
<400> 361
```

```
aggtactctc cgtgccccga cactgaacat tatccagcca gatctgccca gtgccagctc 60
ccactttgta cttttcttac tatcctgtct agaatcatgt cttatgattt taacagatat 120
agaaccactc ctagaaaatg ttctttcact ttctcgtttc ctttttaatc tatcatcctg 180
actactgaac ttaaaatctt tttcttccct tttttgtttc tcttttcttt tatcctgttc 240
a                                                              241
```

<210> 362
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 362
```
aggtactttt atacctngct tangtcagtg acagatttac caatgacaac acaattttaa 60
aattccaaca catatattac tttgtcctat gaagggcaaa aagtcaatat attttaaatt 120
ttaaaaacag aatggatata atgacctttt tacacatcag tgatatttaa aagacttaaa 180
gagacaatac tatggttgag acactggctt cctattccag ccctaattaa agaaaaaata 240
g                                                              241
```

<210> 363
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 363
```
ttangtacta aaaacaaaat cctaattctg ttttaaagag ctgggagatg ttaatcatat 60
gctcagtttt tccacgttat aatttcctaa atgcaaactt ttcaatcagg gcagttcaaa 120
ttcattacat cacagtaaat aacagtagcc aactttgatt ttatgcttat aggaaaaaaa 180
atcctgtaga tataaaaaca gcaaattttg acaaataaaa ctcaaaccat tcatccctaa 240
a                                                              241
```

<210> 364
<211> 241
<212> DNA
<213> Homo sapiens

<400> 364
```
ggtacaagca gttagtcctg aaggcccctg ataagaatgt catcttctcc ccactgagca 60
tctccaccgc cttggccttc ctgtctctgg gggcccataa taccaccctg acagagattc 120
tcaaaggcct caagttcaac ctcacggaga cttctgaggc agaaattcac cagagcttcc 180
agcacctcct gcgcaccctc aatcagtcca gcgatgagct gcagctgagt atgggaaatg 240
c                                                              241
```

<210> 365
<211> 241
<212> DNA

109

<213> Homo sapiens

<400> 365
cgaggtactg agattacagg catgagccac cacgcccggc caaaaacatt taaaaaatga 60
ctgtccctgc tcaaatactg cagtaggaaa tgtaatttga catatatcac ttccagaaaa 120
aaactttaaa tctttctata aaatgaattt gatacatcat cagcatgaag tgaagttaaa 180
atctcttaca aagtaaattc aggtatatca acaatgagat ccaaaagtat cggttcaaga 240
t   241

<210> 366
<211> 241
<212> DNA
<213> Homo sapiens

<400> 366
ggcaggtaca catcaaacac ttcattgcct aaatgcaggg acatgcttcc atctgaccac 60
ttgactatcc gagcattgct ttctttaatt tcatttcctt cttcatctcg gcgtatcctc 120
catcttatag tattttctac ctttaatttt aacctggttc taccttcttc atccagcatt 180
tcttcatctt caaattcatc ttcataatac tgggctctac acttgagaaa gttgggcagt 240
t   241

<210> 367
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 367
gcaggtacaa ataattcctg ttgtnacatt tagtggacgc gattatctgt atacctcaaa 60
ttttaattta agaaagtatc acttaaagag catctcattt tctatagatt gaggcttaat 120
tactgaaaag tgactcaacc aaaaagcaca taacctttta aaggagctac acctaccgca 180
gaaagtcaga tgccctgtaa ataactttgg tctttcaaaa tagtggcaat gcttaagata 240
c   241

<210> 368
<211> 241
<212> DNA
<213> Homo sapiens

<400> 368
tttgtacatt gttaatagtg accctcggag gaaatggatt tctcttctat taaaaactct 60
atggtatata agcattacat aataatgcta cttaaccacc ttttgtctca agaattatca 120
ccaaagtttt ctggaaataa gtccacataa gaattaaata tttaaaaggt gaaatgttcc 180
ttattttaac tttagcaaga tcttttcttt ttcattaaga aacactttaa taattttaaa 240
g   241

<210> 369
<211> 241
<212> DNA
<213> Homo sapiens

```
<400> 369
gcaggtactt tattcttatt tcttatccta tattctgtgt tacagaaaaa ctactaccat 60
aaacaaaaca ccaaccagcc acagcagttg tgtcaagcat gacaattggt ctagtcttca 120
cattttatta gtaagtctat caagtaagag atgaagggtc tagaaaacta gacacaaagc 180
aaccagggtc caaatcacca aggtagatct gtgcttagct aaagggaaac acccgaagat 240
t                                                                  241

<210> 370
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 370
ngttcacagt gcccctccgg cctcgccatg aggctcttcc tgtcgctccc ggtcctggtg 60
gtggttctgt cgatcgtctt ggaaggccca gccccagccc aggggacccc agacgtctcc 120
agtgccttgg ataagctgaa ggagtttgga aacacactgg aggacaaggc tcgggaactc 180
atcagccgca tcaaacagag tgaactttct gccaagatgc gggagtggtt ttcagaagac 240
a                                                                  241

<210> 371
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 371
ggcaggtcat cttgagcctt gcacatgata ctcagattcc tcacccttgc ttaggagtaa 60
aacaatatac tttacagggt gataataatc tccatagtta tttgaagtgg cttgaaaaag 120
gcaagattga cttttatgac attggataaa atctacaaat cagccctcga gttattcaat 180
gataactgac aaactaaatt atttccctag aaaggaagat gaaaggnagt ggagtgtggt 240
t                                                                  241

<210> 372
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 372
aggtacagca aagcgaccct tggtgnnata gatcagacgg aaattctctc ccgtcttgnc 60
aatgctgatg acatccatga atccagcagg gtaggttata tcagttcgga ccttgccatc 120
gattttaatg aaccgctgca tgcaaatctt ctttacttca tctcctgtca gggcatactt 180
```

111

aagtctgttc ctcaggaaaa tgatgagggg gagacactct ctcaacttgt ggggaccggt 240
g   241

<210> 373
<211> 241
<212> DNA
<213> Homo sapiens

<400> 373
tactgaaaca gaaaaaatgt attcccacaa aagctgttac acagcggttt cccgtcccca 60
gaagcagtag aaaatcttag cattccaatg gaaggcatgt atttgtaaaa tattctaaaa 120
tcagctctat agtttccttg tcctctttga taagggatca gacagagggt gtgtcccccct 180
tcagcagcta cccttcttga caaactggtc tccaataata cctttcagaa acttacaaga 240
c   241

<210> 374
<211> 241
<212> DNA
<213> Homo sapiens

<400> 374
caggtactaa aacttacaat aaatatcaga gaagccgtta gttttacag catcgtctgc 60
ttaaaagcta agttgaccag gtgcataatt tcccatcagt ctgtccttgt agtaggcagg 120
gcaatttctg ttttcatgat cggaatactc aaatatatcc aaacatcttt ttaaaacttt 180
gatttatagc tcctagaaag ttatgttttt taatagtcac tctactctaa tcaggcctag 240
c   241

<210> 375
<211> 241
<212> DNA
<213> Homo sapiens

<400> 375
aggtacaaag gaccagtatc cctacctgaa gtctgtgtgt gagatggcag agaacggtgt 60
gaagaccatc acctccgtgg ccatgaccag tgctctgccc atcatccaga agctagagcc 120
gcaaattgca gttgccaata cctatgcctg taagggggcta gacaggattg aggagagact 180
gcctattctg aatcagccat caactcagat tgttgccaat gccaaaggcg ctgtgactgg 240
g   241

<210> 376
<211> 241
<212> DNA
<213> Homo sapiens

<400> 376
ggtacatttt actttccttc tttcagaatg ctaataaaaa acttttgttt atacttaaaa 60
aaaccataaa tcagacaaac aaaagaaacg attccaacat cacttctgtg atgagaaaag 120
aggcaatgga attcaacata agcaaagaaa actctacctg gaggaaagaa atcgatcagc 180
gaagaaacaa ctcggggctg ctgccagact gcaggccatg cgaggaggag cctcctagag 240
g   241

<210> 377
<211> 241
<212> DNA
<213> Homo sapiens

112

```
<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 377
tcctttctgt ccaggtgatt cacagactag acctttctta tcctcctcct agagttttga 60
cttgggactc tagtgttaag atgatgagcc cgtgcatcag gtccttctgc actttggtgg 120
aagtctccca gggtaggttt cctatttgaa acagtggaat catgtttcca gtgataaagt 180
ttaatgacct catccttttt tttttttttc tcatctgcca tttgtgtgtc ttanatgggt 240
t                                                                   241

<210> 378
<211> 241
<212> DNA
<213> Homo sapiens

<400> 378
aggtcagcga tcaggtcctt tatgggcagc tgctgggcag ccccacaagc ccagggccag 60
ggcactatct ccgctgcgac tccactcagc ccctcttggc gggcctcacc cccagcccca 120
agtcctatga gaacctctgg ttccaggcca gccccttggg gaccctggta accccagccc 180
caagccagga ggacgactgt gtctttgggc cactgctcaa cttccccctc ctgcagggga 240
t                                                                   241

<210> 379
<211> 241
<212> DNA
<213> Homo sapiens

<400> 379
tacggagcaa tcgaagaggc atatccacac ttggggtggc tatagggctg gaaaatgctg 60
aagatgactg ctttcactga ggtcaaggat tgtaatattg ccagctttgt aaagccatta 120
aagcagaagt ttcttcagtg atcttctctc taagaaacac catcacctcc atgtgcctta 180
cagaggcccc ctgcgttctg ctgcattgct tttgcgcaat cccttgatga tgaagatggt 240
c                                                                   241

<210> 380
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 380
acgtacacgc agaccgacat gggnnnttca ggcntnagat caaactcaaa acctgnaatg 60
atatccactc tcttttttctt aagctcaggg aaatattcca agtagaagtc canaaagtca 120
tcggctaana tgcttcngaa tttgaattca tgcacatagg ccttgaaaaa actgtcaaac 180
tgannctgat cacccaccaa gtgggccntn tatgacacaa agcagaaacc tttctcntan 240
g                                                                   241

<210> 381
```

113

```
<211> 241
<212> DNA
<213> Homo sapiens

<400> 381
aggtacaact taatggatta gcttttgggt ttaactgaat atatgaagaa attgggtctg 60
tctaaagaga gggtatttca tatggctttt agttcacttg tttgtatttc atcttgattt 120
tttcttttgg aaaataaagc attctatttg gttcagattt ctcagatttg aaaaaggctc 180
tatctcagat gtagtaaatt atttccttc agttgtgaa agcaggattt gactctgaaa 240
g                                                                  241

<210> 382
<211> 241
<212> DNA
<213> Homo sapiens

<400> 382
gtactgctat aatcaatacg tctgatagac aggtttatcc actatattga ccctacctct 60
aaaaggattg tcataattta tatgctttat gtttacacct atgatacagt tgccttggaa 120
cacaaaattt ttcattgtaa ttaaaaaaag aagagttgtg cagacagaag aaatcaaatc 180
taagaaaatc acaggagtag ataaatactc tagaattcat ataccttgg aagatgggtt 240
t                                                                  241

<210> 383
<211> 241
<212> DNA
<213> Homo sapiens

<400> 383
ggcaggtaca aagtcttctc tttgcttttt ataatttaa agcaaataac acatttaact 60
gtatttaagt ctgtgcaaat aatccttcag aagaaatatc caagattctg tttgcagagg 120
tcattttgtc tctcaaagat gattaaatga gttcgtcttc agataaagtg ctcctgtcca 180
gcagaactca aaaggccttc aagctgttca gtaagtgtag ttcagataag actccgtcat 240
a                                                                  241

<210> 384
<211> 241
<212> DNA
<213> Homo sapiens

<400> 384
ggtacacaaa atacacttgc aagcttgctt acagagacct gttaaacaaa gaacagacag 60
attctataaa atcagttata tcaacatata aaggagtgtg attttcagtt tgttttttta 120
agtaaatatg accaaactga ctaaataaga aggcaaaaca aaaaattatg cttccttgac 180
aaggcctttg gagtaaacaa aatgctttaa ggctcctggt gaatggggtt gcaaggatga 240
a                                                                  241

<210> 385
<211> 241
<212> DNA
<213> Homo sapiens

<400> 385
ggcaggtcta caatggctct gtcccttctg tggaatcgtt acaccaagag gtctcagtcc 60
tggtccctga ccccacagtg agctgtttag atgatccttc acatcttcct gatcaactgg 120
```

```
aagacactcc aatcctcagt gaagactctc tggagccctt caactctctg gcaccaggta 180
ggtttggagg ctatgtccct ttaacttatc catgcagagt agccaaactt tacctgaaag 240
a                                                                   241
```

<210> 386
<211> 241
<212> DNA
<213> Homo sapiens

<400> 386
```
aggtaccttt ttcctctcca aaggaacagt ttctaaagtt ttctgggggg aaaaaaaact 60
tacatcaaat ttaaaccata tgttaaactg catattagtt gtgttacacc aaaaaattgc 120
ctcagctgat ctacacaagt ttcaaagtca ttaatgcttg atataaattt actcaacatt 180
aaattatctt aaattattaa ttaaaaaaaa aactttctaa gggaaaaata aacaaatgta 240
g                                                                   241
```

<210> 387
<211> 241
<212> DNA
<213> Homo sapiens

<400> 387
```
accccactgg ccgctgtgga gtatctccac tctcccctcg tgagggccgc tcccaccgac 60
cagtcgaact ttcgtaaatg gagttaatgt gtttccactc cccttttccc ctttctggcc 120
ttttggtcca gaatttcctg gccttccggc atatcctggg agtcctcgac ttccaggaaa 180
gccaattgct ccccgatcac ctttaagacc cggaggacct attggacctg gaaatcctcg 240
t                                                                   241
```

<210> 388
<211> 241
<212> DNA
<213> Homo sapiens

<400> 388
```
tttgtactct tgtccacagc agagacattg agtataccat tggcatcaat gtcaaaagtg 60
acttcaatct gaggaacacc tcggggtgca ggaggtatgc ctgtgagttc aaacttgcca 120
agcaggttgt tatcctttgt catggcacgc tcgccttcat aaacctgaat aagtacacca 180
ggctggttgt cagaataggt agtgaaggtc tgtgtctgct tggtaggaat ggtggtatta 240
c                                                                   241
```

<210> 389
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 389
```
tacctntgtt agtgagcacc ttgtcttntg tgcttatntc ttnaagataa atacatggaa 60
ggatgtgaaa atcggaacac caactatgtg tctcactgca tctaagtgaa gcagccacag 120
ctgtgagagt tttcaaagca gaaagatgct gatgtgacct ctggaattca gacatactga 180
gctatgggtc agaagtgttt tacttaaaaa gcaaacaatc cccaggaaat actgaatagg 240
```

115

```
a                                                                        241


<210> 390
<211> 241
<212> DNA
<213> Homo sapiens


<400> 390
gcaggtacat ccacatgttc ctccaaatga cgtttggggt cctgcttgcc aacattcttt 60
attgccagct gttcaggtgt catcttatct tcttcttcta cagccttatt gtaattcttg 120
gctaattcca acatctcttt taccactgat tcattgcgtt tacaatgttc actgtagtcc 180
tgaagtgtca aaccttccat ccaactcttc ttatgcaaat ttagcaacat cttctgttcc 240
a                                                                        241


<210> 391
<211> 241
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G


<400> 391
cnggcacaan ccttntgtttt tnntnttttt ttttttttttn tctttatttn tttttantnt 60
taaanaaaaa nnntannnaa annngggttt aaatnctntn nncagancat taaaactgaa 120
ggggaaaaaa aaaccaaaaa cgagcttntt anttnacntg ggnttgggnn gntgctgatn 180
tnaagaagca anntttanan cnngcnnnat ganngagngn tcannttgaa atttnnaccc 240
t                                                                        241


<210> 392
<211> 241
<212> DNA
<213> Homo sapiens


<400> 392
gaggtactaa atggtatcct tagattaaaa ttttgtgctt gataacagct gttttttcta 60
cattagaaat aagatgccac acaaggaact acattccaga tttaaagaaa tgaaaggata 120
ccattagtgt gtataacaga ttattgttca tacttgtaaa gcatcttatg tcattgagaa 180
tataaagaac agtgccttag aagacagtga aaggtaagct ctagcttaat gtctatgatt 240
t                                                                        241


<210> 393
<211> 241
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G


<400> 393
ggcaggtaca taagcataat cagttatgga cagcttcttg tataaattgc tattcancaa 60
```

116

```
tacataaact gcctnaaaga tttatgctta caggtagaca ttcaatttac caataaaaca 120
gcatgttctg aaaatatggg cacattttaa aacatattaa gacagttctg ttaaccataa 180
tagtcccaca gtatgactga gtaataagaa tctacttcaa aagnaaaaaa aaaattaatc 240
a                                                              241
```

<210> 394
<211> 241
<212> DNA
<213> Homo sapiens

<400> 394
```
aggtacagca gcagtagatg gctgcaacaa ccttcctcct accccagccc agaaaatatt 60
tctgccccac cccaggatcc gggaccaaaa taaagagcaa gcaggccccc ttcactgagg 120
tgctgggtag ggctcagtgc cacattactg tgctttgaga aagaggaagg ggatttgttt 180
ggcactttaa aaatagagga gtaagcagga ctggagaggc cagagaagat accaaaattg 240
g                                                              241
```

<210> 395
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 395
```
nggcnggnnc caanatatga aatntnanta tnatacatga tnaaaagctt tatntatttt 60
agtgagtaat taagtttaca ctgtgaataa ggattaattc ccagatgacc atctacagtt 120
actaccacat agagggtata cacggatgga tcgattacaa gaatataaaa cttattttcc 180
ttcctgtatc cacatttctt tgcaatgtga atttgcaggc cctctcaaga agtggagtct 240
a                                                              241
```

<210> 396
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 396
```
gaggtacacc ttgaatgaca atgctnggag cccccctgtg gtcatcgacg cctccactgc 60
cattgatgca ccatccaacc tgcgtttcct ggccaccaca cccaattcct tgctggtatc 120
atggcagccg ccacgtgcca ggattaccgg ctacatcatc aagtatgaga agcctgggtc 180
tcctcccaga gaagtggtcc ctcggccccg ccctggtgtc acagaggcta ctattactgg 240
c                                                              241
```

<210> 397
<211> 241
<212> DNA
<213> Homo sapiens
```

```
<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 397
ggcaggtacc agcagggggga tgtgtttctg gggaattgtg gctctggaag cttcacggtt 60
tcccagaatg tggaaaatat atctgtgcan gatagaaatc ctgcccagag gctgtttctg 120
tctcatttga gctctccttc atgtggcaga gctgactgtg gcggtttagg agcctacatt 180
ttagaaaagc ttacctcaaa gttctgcatt gagcctgagc actggaaagg agataaaata 240
a                                                              241


<210> 398
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 398
gangtgacca ngacatcacc tnacacntgg aaagcganga nttgaatggt gcntacaang 60
ccntaccent tgcccannac ctgaacgcgc cttntgattg ggacagccgt gggaaggaca 120
gttatgaaac nantcanctg gatgaccana gtgntgaaac cnacanncac angcnntcna 180
cattatataa ncggaaagct aatgatgaga gcaatgatca ttccgatgtn attgatagtc 240
a                                                              241


<210> 399
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 399
cagagtgaga tgggagtggg agggccaatc tgatacagaa gggggtgaag ggtagggccc 60
ctgagcagcc caccccttac cctgacgaag gcaatcctcc tctggaatgt ctcttccctc 120
ttcagtctgg gttctgcctc agccacgaac tgggaaggag tgaggaacat cccaacggca 180
atgagagtat cccagtgact ccaaacagga angaatcagt gttcanaaag tcagggccct 240
t                                                              241


<210> 400
<211> 241
<212> DNA
<213> Homo sapiens

<400> 400
ggtactcttg ctcttttagc tagagtgtat gtgaaaataa agaaatacat cattgtattc 60
acaaccatgt gtcttcattt ataacttttt gtttaaaaaa tttttagttc aagtttagtt 120
```

118

```
cattgatatt atcctctgaa tgcagttaag gctgggcaga aattctactc atgtgacatc 180
tgccacaggt ctattttgaa gctttttcttc taatgggcaa tgtttgtcct taccaggatt 240
t                                                                    241
```

```
<210> 401
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 401
nncaggtact ttgtagagca gagagaggct ttggttcctc ctttcttcaa tcacgtggag 60
atgtgtcatc acctgggatt tcatctgggc cgccttttct gggtcaacag ccaacacatg 120
ctggtaatga cggatggtat gtaagcgatc tttgttctca gcacggacat aacgccgtaa 180
ggcctggaga atgcgatgag gccgtggcgg gtcagactgc aaggcagcca ggtagttctc 240
c                                                                    241
```

```
<210> 402
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 402
ggcaggtcca aaaaaaacct aaaaaanngtt tcaggaatgt agagaaatat ccaacttaaa 60
tagcgaaaaa gtgcaccata attactgctg cactgcagtc atttctgcaa ttcccatgtt 120
tcttaaataa ctatcttgtc agataacaca caatataaag agcaattatg aaaaacagac 180
atttacatat acttctaaag tcttattggg aatatcctgt ttggccattg ggataaccaa 240
t                                                                    241
```

```
<210> 403
<211> 241
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 403
aggtgttaac tacccgctcc gagacgggat tgatgacgag tcctatgang ccattttcaa 60
gccggtcatg tccaaagtaa tggagatgtt ccagcctagt gcggtggtct tacagtgtgg 120
ctcagactcc ctatctgggg atcggttagg ttgcttcaat ctaactatca aaggacacgc 180
caagtgtgtg gaatttgtca agagctttaa cctgcctatg ctgatgctgg gaggcggtgg 240
t                                                                    241
```

119

```
<210> 404
<211> 241
<212> DNA
<213> Homo sapiens

<400> 404
caggtactgc aacccataaa atactgtttc ctcatatttc accttcctta atttggagtt 60
ttctgtcttc ttttcacggc attcaaagta ggaataaact ttgcttgtgt tgggtggata 120
ttgtttatag tgagtaacct tgtaggagtc ggtggccagg aggatgttga actcggcttc 180
tgccgcagga ttcatctcgg gccggaggac aaggggcccg cgcgccgcga gctccctgac 240
c                                                                 241


<210> 405
<211> 266
<212> DNA
<213> Homo sapiens

<400> 405
ttctgggctg gggagtggag agaaagaagt tgcagggctt acaggaaatc ccagagcctg 60
aggttttctc ccagatttga gaactctaga ttctgcatca ttatctttga gtctatattc 120
tcttgggctg taagaagatg aggaatgtaa taggtctgcc ccaagccttt catgccttct 180
gtaccaagct tgtttccttg tgcatcettc ccaggctctg ctgcccctt attggagaat 240
gtgatttcca agacaatcaa tccaca                                      266


<210> 406
<211> 231
<212> DNA
<213> Homo sapiens

<400> 406
ttggtgaaga accattcctc ggcatccttg cggttcttct ctgccatctt ctcatactgg 60
tcacgcatct cgttcagaat gcggctcagg tccacgccag gtgcagcgtc catctccaca 120
ttgacatctc cacccacctg gcctctcagg gcattcatct cctcctcgtg gttcttcttc 180
aggtaggcca gctcctcctt caggctctca atctgcatct ccaggtcagc t          231


<210> 407
<211> 266
<212> DNA
<213> Homo sapiens

<400> 407
cagcatcatt gtttataatc agaaactctg gtccttctgt ctggtggcac ttagagtctt 60
ttgtgccata atgcagcagt atggagggag gattttatgg agaaatgggg atagtcttca 120
tgaccacaaa taaataaagg aaaactaagc tgcattgtgg gttttgaaaa ggttattata 180
cttcttaaca attctttttt tcagggactt ttctagctgt atgactgtta cttgaccttc 240
tttgaaaagc attcccaaaa tgctct                                      266


<210> 408
<211> 261
<212> DNA
<213> Homo sapiens

<400> 408
ctgtgtcagc gagcctcggt acactgattt ccgatcaaaa gaatcatcat ctttaccttg 60
acttttcagg gaattactga acttcttct cagaagatag ggcacagcca ttgccttggc 120
```

120

```
ctcacttgaa gggtctgcat ttgggtcctc tggtctcttg ccaagtttcc cagccactcg 180
agggagtaat atctggaggg caaagaagag acttatgtta ttgttgaacc tccagccaca 240
gggaggagca tgggcatggg t                                          261
```

<210> 409
<211> 266
<212> DNA
<213> Homo sapiens

<400> 409
```
gctgacagta atacactgcc acatcttcag cctgcaggct gctgatggtg agagtgaaat 60
ctgtcccaga cccgctgcca ctgaatcggt cagggatccc ggattcccgg gtagatgccc 120
agtaaatgag cagtttagga ggctgtcctg gtttctgctg gtaccaagct aagtagttct 180
tattgttgga gctgtctaaa acactctggc tggtcttgca gttgatggtg gccctctcgc 240
ccagagacac agccagggag tgtgga                                     266
```

<210> 410
<211> 181
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 410
```
caaaaggtnc tttttgntca aaancnattt ttattccttg atatttttct tttttttttt 60
tttgnggatg gggacttgtg aatttttcta aaggggnnnn ttnannnngg aagaaaaccn 120
ngntccggtt ccagccaaac cngtngctna ctttccacct tntttccacc tccctcnggt 180
t                                                               181
```

<210> 411
<211> 261
<212> DNA
<213> Homo sapiens

<400> 411
```
gcccctgcag tacttggccg atgtggacac ctctgatgag gaaagcatcc gggctcacgt 60
gatggcctcc caccattcca agcggagagg ccgggcgtct tctgagagtc agggtctagg 120
tgctggagtg cgcacggagg ccgatgtaga ggaggaggcc ctgaggagga agctggagga 180
gctggccagc aacgtcagtg accaggagac ctcgtccgag gaggaggaag ccaaggacga 240
aaaggcagag cccaacaggg a                                          261
```

<210> 412
<211> 171
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 412
```

121

```
nttttntctt tacaattcag tcttcaacaa cttgagagct ttcttcatgt tgncaagcaa 60
cagagctgta tctgcaggnt cgtaagcata nagacngttt gaatatcttc cagngatatc 120
ggctctaact gncagagatg ggtcaacaaa cataatcctg gggacatact g            171
```

<210> 413
<211> 266
<212> DNA
<213> Homo sapiens

<400> 413
```
ttaggaccaa agatagcatc aactgtattt gaaggaactg tagtttgcgc attttatgac 60
attttttataa agtactgtaa ttctttcatt gaggggctat gtgatggaga cagactaact 120
cattttgtta tttgcattaa aattattttg ggtctctgtt caaatgagtt tggagaatgc 180
ttgacttgtt ggtctgtgta aatgtgtata tatatatacc tgaatacagg aacatcggag 240
acctattcac tcccacacac tctgct                                        266
```

<210> 414
<211> 266
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 414
```
tttgccataa ttgagtgaaa agtggcagat ggcattaact ctgctccgct tcaagctggc 60
tccatgacca ctcaaggcct ccccancctg ttcgtcaagt tgtcctcaag tccaagcaat 120
ggaatccatg tgtttgcaaa aaaagtgtgc tanttttaag gnctttcgta taagaatnaa 180
tganacaatt ttcctaccaa aggangaaca aaaggataaa tataatacaa aatatatgta 240
tatggttgtt tgacaaatta tataac                                        266
```

<210> 415
<211> 266
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(241)
<223> n = A,T,C or G

<400> 415
```
cctccatcca gtctattaat tgttgccggg aagctanagt aagtagttcg ccagttaata 60
gtttgcgcaa cgttgttgcc attgctacag gcatcgtggt gtnacgctcg tcgattggta 120
tggcttcatt cagctccggt tcccaacgat caaggcgagt tacatgatcc cccatgttgt 180
gcaaaaaagc ggttagctcc ttcggtcctc cgatcgttgt canaagtaag ttggccgcag 240
tgttatcact catggttatg gcagca                                        266
```

<210> 416
<211> 878
<212> DNA
<213> Homo sapiens

<400> 416
```
cctgacgata gccatggctg taccacttaa ctatgattct attccaactg ttcagaatca 60
tatcacaaaa tgacttgtac acagtagttt acaacgactc ccaagagagg aaaaaaaaaa 120
aaaaagacgc ctcaaaattc actcaacttt tgagacagca atggcaatag gcagcagaga 180
agctatgctg caactgaggg cacatatcat tgaagatgtc acaggagttt aagagacagg 240
ctggaaaaaa tctcatacta agcaaacagt agtatctcat accaagcaaa accaagtagt 300
atctgctcag cctgccgcta acagatctca caatcaccaa ctgtgcttta ggactgtcac 360
caaagtcaga ttcggtgcta accaggtggc atctatgatc aacgtcgccc ctcttattta 420
acaaagggct ctgaaggagg tgttctccaa gcaacaagga gactgcttca gtacaagact 480
ttgcacccttg aattcaattg catcaagtgt ggatagcaaa ataagtatct taccattgaa 540
atatgtgttc agcctaagat tttacccacc agcagaacaa aagtgagggt gagagggatg 600
ggccagtgag gggatggggg agaaaaaaaa atcacaggat taccaccaaa gccttgtttt 660
aaaagggctc ccttcactat tcaggaaggg aagtggaagg agaaattaac caattcctgc 720
cacagcagcc cttttggct gcttccacaa tagatacttt atggagtggc acagccaacc 780
ctatctgtga cctgccctgc ggataaacac agccaagcag gtttaattag atcaaagaca 840
caaagggcta ttccctcctt tcataacaac gcagacct                            878
```

<210> 417
<211> 514
<212> DNA
<213> Homo sapiens

<400> 417
```
ttctgacttc tagaagacta aggctggtct gtgtttgctt gtttgcccac ctttggctga 60
tacccagaga acctgggcac ttgctgcctg atgcccaccc ctgccagtca ttcctccatt 120
cacccagcgg gaggtgggat gtgagacagc ccacattgga aaatccagaa aaccgggaac 180
agggatttgc ccttcacaat tctactcccc agatcctctc ccctggacac aggagaccca 240
cagggcagga ccctaagatc tggggaaagg aggtcctgag aaccttgagg tacccttaga 300
tccttttcta cccactttcc tatggaggat tccaagtcac cacttctctc accggcttct 360
accagggtcc aggactaagg cgttttctcc atagcctcaa cattttggga atcttccctt 420
aatcacccctt gctcctcctg ggtgcctgga agatggactg gcagagacct ctttgttgcg 480
ttttgtgctt tgatgccagg aatgccgcct agtt                               514
```

<210> 418
<211> 352
<212> DNA
<213> Homo sapiens

<400> 418
```
ctgcaccagc gattaccagt ggcattcaaa tactgtgtga ctaaggattt tgtatgctcc 60
ccagtagaac cagaatcaga caggtatgag ctagtcaaca gcaagtcttt gttggattcg 120
agtaggctca ggatctgctg aaggtcggag gagttagtcc ccgcaatcaa gagcctgtct 180
tcctgaagcc cttggtgata ttttgccact cagccaagaa tgaggatgca tccttcagat 240
tctctatgtc ccgaacctgg aacccatcca cgccagcttg cagccaaaac tccagagcat 300
ccttcacctt ggtggaaaaa aaaaaaaaa aaaaaaaaa aaaaaaaaa aa               352
```

<210> 419
<211> 344
<212> DNA
<213> Homo sapiens

<400> 419
```
ctggacacca taatcccttt taagtggctg gatggtcaca cctctcccat tgacaagctg 60
ggttaagtca ataggttgac taggatcaac acgacccaaa tcaataagat actgcagtct 120
attgagactc aaaggcttat actggcgtct gaaactatgt ccttcgttaa acccgtattt 180
```

```
tgggattcgg atgtaaaatg gagtctggcc tccctcaaag cccaagcggg gccgggttcc 240
tctttgcctt tctcctttat ggcctctgcc acattttcta cctcttctcc gacctcttgg 300
tcttctctcc ggtttcttgg agccgggatt cggctttaag ttgg             344
```

```
<210> 420
<211> 935
<212> DNA
<213> Homo sapiens
```

```
<400> 420
cgaaagtcaa cgttaagggg ctcaggtgaa ccatgatgat gaccttctgt tgactttgaa 60
atattggctc ttgtgggtga caaaagccag acaagctgtg gctgtggtcc gattttaaga 120
cgaggttctc aaagatccaa aggagggaaa gggtattgga aacactgtgt atcatctgag 180
acacacgtgt cctcatgatc ttaaatgcct actttaaagc cacctaatac tgcccttcat 240
tgtggtcaga agagatttct acaaaagcac tcagaattct ggaggcagtt gtgattttgc 300
catgtggcag ttggtttgtg gagttgggca ggtgtgaaag ggtaaaactc cacttctgaa 360
tgctgcttct gccccctggg acccagcaca ttgttagacc atcttcttga ctgaaaattc 420
tctcctgatg ctgagccctg caccaccacc ttccttttcc taactatgaa ttgatggcaa 480
agtccactca aaacaaccag ttaagtgctc acgagagagt agtcaagcac ctccagaaag 540
aaaccgggtt tttgttcaca tagcaggaag tgactccctg ggtggtaatt tatcttggaa 600
acacaggtag attggcagaa aaacgggaac atgtaggtac cgcgatgttg gtgcatgtcc 660
attactttgg gataggcttt ctcagtcttt cctcaaatga tagttgagcc agttttccag 720
tggcaattct gagtgacttg cgcttgtctt atggtgtggt caagggacgt tcagaactac 780
ggaaaacttt tactgaaaca gcgaagcaga gtataccggc atgagaggga agatgaacac 840
tcacctatgt accactcttt gacaataaat atagtatttc tcaaaaaaaa aaaaaaaaaa 900
agtaaaaaaa ctgaaatcgc aagtcaaaaa atcca             935
```

```
<210> 421
<211> 745
<212> DNA
<213> Homo sapiens
```

```
<400> 421
ggcttcgagc ggccgcccgg gcaggtccta gatgtcattt gggacccttc acaaccattt 60
tgaagccctg tttgagtccc tgggatatgt gagctgtttc tatgcataat ggatattcgg 120
ggttaacaac agtcccctgc ttggcttcta ttctgaatcc ttttctttca ccatggggtg 180
cctgaagggt ggctgatgca tatggtacaa tggcacccag tgtaaagcag ctacaattag 240
gagtggatgt gttctgtagc atcctattta aataagccta ttttatcctt tggcccgtca 300
actctgttat ctgctgcttg tactggtgcc tgtacttttc tgactctcat tgaccatatt 360
ccacgaccat ggttgtcatc cattacttga tcctacttta catgtctagt ctgtgtggtt 420
ggtggtgaat aggcttcttt ttacatggtg ctgccagccc agctaattaa tggtgcacgt 480
ggacttttag caagcgggct cactggaaga gactgaacct ggcatggaat tcctgaagat 540
gtttgggggtt tttttctttc ttaatcgaaa gttaacattg tctgaaaagt tttgttagaa 600
ctactgcgga acctcaaaat cagtagattt ggaagtgatt caaagctaaa cttttttcctt 660
ggccctcctt gtgttctaat tgcttgcaag tgtaatacta ggatgtccaa gatgccagtt 720
tttgcttctt tgttagttgt cagac             745
```

```
<210> 422
<211> 764
<212> DNA
<213> Homo sapiens
```

```
<400> 422
gagttcagta gcaaagtcac acctgtccaa ttccctgagc tttgctcact cagctaatgg 60
gatggcaaag gtggtggtgc tttcatcttc aggcagaagc ctctgcccat cccccctcaag 120
```

124

```
ggctgcaggc ccagttctca tgctgccctt gggtgggcat ctgttaacag aggagaacgt 180
ctgggtggcg gcagcagctt tgctctgagt gcctacaaag ctaatgcttg gtgctagaaa 240
catcatcatt attaaacttc agaaaagcag cagccatgtt cagtcaggct catgctgcct 300
cactgcttaa gtgcctgcag gagccgcctg ccaagctccc cttcctacac ctggcacact 360
ggggtctgca caaggctttg tcaaccaaag acagcttccc ccttttgatt gcctgtagac 420
tttggagcca agaaacactc tgtgtgactc tacacacact tcaggtggtt tgtgcttcaa 480
agtcattgat gcaacttgaa aggaaacagt ttaatggtgg aaatgaacta ccatttataa 540
cttctgtttt tttattgaga aaatgattca cgaattccaa atcagattgc caggaagaaa 600
taggacgtga cggtactggg ccctgtgatt ctcccagccc ttgcagtccg ctaggtgaga 660
ggaaaagctc tttacttccg cccctggcag ggacttctgg gttatgggag aaaccagaga 720
tgggaatgag gaaaatatga actacagcag aagcccctgg gcag               764
```

```
<210> 423
<211> 1041
<212> DNA
<213> Homo sapiens

<400> 423
ctcagagagg ttgaaagatt tgcctacgaa agggacagtg atgaagctaa gctctagatc 60
caggatgtct gacttcaaat tgaaactccc aaagtaatga gtttggaagg gtggggtgtg 120
gcctttccag gatgggggtc tttttctgctc ccagcggata gtgaaacccc tgtctgcacc 180
tggttgggcg tgttgctttc ccaaaggttt tttttttagg tccgtcgctg tcttgtggat 240
taggcattat tatctttact ttgtctccaa ataacctgga gaatggagag agtagtgacc 300
agctcagggc cacagtgcga tgaggaccat cttctcacct ctctaaatgc aggaagaaac 360
gcagagtaac gtggaagtgg tccacaccta ccgccagcac attgtgaatg acatgaaccc 420
cggcaacctg cacctgttca tcaatgccta caacaggtat tgggatgtag ttcagccaca 480
tcattgctat ttatgaggtg tcttctgtag atccgaaatg tgggacagat gagagggaga 540
gtataaaatg agcggaagag gcaggctctg agtttgagca aatagattaa taggacaggt 600
gtccccagga aggacacctg gcctgtaagc tggttcctgg cattcagctc gccttgcagg 660
gatctgaaca aacactccag accactgggg gtgcagacgt gagagggacg cagtcgcaca 720
ctcagagggt tgagagtaaa tatgtgtgcc cgctgctgac cttcacgaaa ggccaaatgt 780
aagaagagct aagtgagaga gcagcaaagc actcctggag ccggggata atccaggcag 840
gcttctggga gtttgtcatt ccaaggataa ggaggacctg aacatggcct ttgcctaagg 900
cgtggccctc tcaaccagca ctaggtgctt atctggagct cagctagggg aggagacagc 960
tcagggccat tggtgtcagc cagagactct gtaatcttcc agggagctcg ctcaacctgc 1020
tgagctcgct ctgccacgca c                                        1041
```

```
<210> 424
<211> 1288
<212> DNA
<213> Homo sapiens

<400> 424
ctaagaactg agacttgtga cacaaggcca acgacctaag attagcccag ggttgtagct 60
ggaagaccta caacccaagg atggaaggcc cctgtcacaa agcctaccta gatggataga 120
ggacccaagc gaaaaaggta tctcaagact aacggccgga atctggaggc ccatgaccca 180
gaacccagga aggatagaag cttgaagacc tggggaaatc ccaagatgag aaccctaaac 240
cctacctctt ttctattgtt tacacttctt actcttagat atttccagtt ctcctgttta 300
tctttaagcc tgattctttt gagatgtact ttttgatgtt gccggttacc tttagattga 360
cagtattatg cctgggccag tcttgagcca gctttaaatc acagctttta cctatttgtt 420
aggctatagt gttttgtaaa cttctgtttc tattcacatc ttctccactt gagagagaca 480
ccaaaatcca gtcagtatct aatctggctt ttgttaactt ccctcaggag cagacattca 540
tataggtgat actgtatttc agtcctttct tttgacccca gaagccctag actgagaaga 600
taaaatggtc aggttgttgg ggaaaaaaaa gtgccaggct ctctagagaa aaatgtgaag 660
agatgctcca ggccaatgag aagaattaga caagaaatac acagatgtgc cagacttctg 720
```

```
agaagcacct gccagcaaca gcttccttct ttgagcttag tccatccctc atgaaaaatg 780
actgaccact gctgggcagc aggagggatg atgaccaact aattcccaaa ccccagtctc 840
attggtacca gccttgggga accacctaca cttgagccac aattggtttt gaagtgcatt 900
tacaagtttc tggcatcact accactactg attaaacaag aataagagaa catttttatca 960
tcatctgctt tattcacata aatgaagttg tgatgaataa atctgctttt atgcagacac 1020
aaggaattaa gtggcttcgt cattgtcctt ctacctcaaa gataatttat tccaaaagct 1080
aagataaatg gaagactctt gaacttgtga actgatgtga aatgcagaat ctcttttgag 1140
tctttgctgt ttggaagatt gaaaaatatt gttcagcatg ggtgaccacc agaaagtaat 1200
cttaagccat ctagatgtca caattgaaac aaactgggga gttggttgct attgtaaaat 1260
aaaatatact gttttgaaaa aaaaaaac                                   1288
```

```
<210> 425
<211> 446
<212> DNA
<213> Homo sapiens
```

```
<400> 425
ccacttaaag ggtgcctctg ccaactggtg gaatcatcgc cacttccagc accacgccaa 60
gcctaacatc ttccacaagg atcccgatgt gaacatgctg cacgtgtttg ttctgggcga 120
atggcagccc atcgagtacg gcaagaagaa gctgaaatac ctgccctaca atcaccagca 180
cgaatacttc ttcctgattg ggccgccgct gctcatcccc atgtatttcc agtaccagat 240
catcatgacc atgatcgtcc ataagaactg ggtggacctg gcctgggccg tcagctacta 300
catccggttc ttcatcacct acatcccttt ctacggcatc ctgggagccc tccttttcct 360
caacttcatc aggttcctgg agagccactg gtttgtgtgg gtcacacaga tgaatcacat 420
cgtcatggag attgaccagg aggacc                                     446
```

```
<210> 426
<211> 874
<212> DNA
<213> Homo sapiens
```

```
<400> 426
ttttttttt tttttttttt ttttttcaat taaagatttg atttattcaa gtatgtgaaa 60
acattctaca atggaaactt ttattaaatg ctgcatgtac tgtgctatgg accacgcaca 120
tacagccatg ctgtttcaga agacttgaaa tgccattgat agtttaaaaa ctctacaccc 180
gatggagaat cgaggaagac aatttaatgt ttcatctgaa tccagaggtg catcaaatta 240
aatgacagct ccacttggca aataatagct gttacttgat ggtatccaag aagaaatggt 300
tggtgatgga taaattcaga aatgcttccc caaaggtggg tggtttttaa aaagttttca 360
ggtcacaacc cttgcagaaa acactgatgc ccaacacact gattcgcggt ccaggaaaca 420
cgggtcttcc aagttccaag gggctggggt tccccaacga tcaagttcct gtgctgtaat 480
caagagggtc ctttggactg gatagggagc acttgggagc tgtacaccat cagtcataat 540
ggatggcagt gtaaaagatg atccaaatga cctgagatgc tcctgaggag tggtgcacca 600
gacccaggag tgccactgta gggctgcttc tttgctttag tcatcacaca cacacacagc 660
tccagagcag caatggcctt tcctgtaaca ggaaaaaagc ctcctgctat tcccaagaac 720
cctcgtaatg gcaaaactcc ccaaatgaca cccaggacca cagcaatgat ctgtcggaac 780
cagtagatca catctaaaaa ttcatcctta tcctcccagg ccgcgtcgct ccgcagcacc 840
ttactccaga cggagacttt gagggccccg ttgg                            874
```

```
<210> 427
<211> 638
<212> DNA
<213> Homo sapiens
```

```
<400> 427
```

```
acttgtaatt agcacttggt gaaagctgga aggaagataa ataacactaa actatgctat 60
ttgatttttc ttcttgaaag agtaaggttt acctgttaca tttcaagtt aattcatgta 120
aaaaatgata gtgattttga tgtaatttat ctcttgtttg aatctgtcat tcaaaggcca 180
ataatttaag ttgctatcag ctgatattag tagctttgca accctgatag agtaaataaa 240
ttttatgggc gggtgccaaa tactgctgtg aatctatttg tatagtatcc atgaatgaat 300
ttatggaaat agatatttgt gcagctcaat ttatgcagag attaaatgac atcataatac 360
tggatgaaaa cttgcataga attctgatta aatagtgggt ctgtttcaca tgtgcagttt 420
gaagtattta ataaccact cctttcacag tttattttct tctcaagcgt tttcaagatc 480
tagcatgtgg attttaaaag atttgccctc attaacaaga ataacattta aaggagattg 540
tttcaaaata tttttgcaaa ttgagataag gacagaaaga ttgagaaaca ttgtatattt 600
tgcaaaaaca agatgtttgt agctgtttca gagagagt                         638
```

```
<210> 428
<211> 535
<212> DNA
<213> Homo sapiens
```

```
<400> 428
acaagatgat tcttcctcct caatttgaca gatcaaagaa gtatcccttg ctaattcaag 60
tgtatggtgg tccctgcagt cagagtgtaa ggtctgtatt tgctgttaat tggatatctt 120
atcttgcaag taaggaaggg atggtcattg ccttggtgga tggtcgagga acagcttttcc 180
aaggtgacaa actcctctat gcagtgtatc gaaagctggg tgtttatgaa gttgaagacc 240
agattacagc tgtcagaaaa ttcatagaaa tgggtttcat tgatgaaaaa agaatagcca 300
tatggggctg tcctatgga ggatacgttt catcactggc ccttgcatct ggaactggtc 360
ttttcaaatg tggtatagca gtggctccag tctccagctg ggaatattac gcgtctgtct 420
acacagagag attcatgggt ctcccaacaa aggatgataa tcttgagcac tataagaatt 480
caactgtgat ggcaagagca gaatatttca gaaatgtaga ctatcttctc atcca       535
```

```
<210> 429
<211> 675
<212> DNA
<213> Homo sapiens
```

```
<400> 429
actattttca accctgagca ttaacactgc ataccaaggg ggggtggggtc aagaagctgg 60
ttagatcgaa gcacaagcac aagccactga tattctctat gtgatcaggt ttttacaaaa 120
aaatacatag ttttcaataa ataatgctta attttacaac tttgatacag caatgtcata 180
caccgtttca acacactaca ctctgcatgc tagatagtct acgagaagac gaaactttgc 240
catgcatttt ctttccccc tagtgctatc aaacacttca tcctccagcg cactgcctca 300
ggtagcttta ccttctctct gtttcacagc aataggccgt gcgctggcat gcaaactcta 360
aaaaaggtcc cccccacaaa ccactcagac ttctacacaa aagggttttt cagcttttct 420
gctcccaaac ctggagtggc taagaaagta agtttcatgt ggccttggaa aatacacact 480
tgttaacagt gtcatgctga aaactgctct aaaacatcag gtggttctgt cctggtggcc 540
gtcacgaagc attatgggat gccataacca ctaggagtcc caaaccggaa aaaataggcc 600
tccgttttaa aacagtcaat tcaaaaaagg tgtcacagaa caaatgcaaa agactcttaa 660
acccacaaca tatgt                                                   675
```

```
<210> 430
<211> 434
<212> DNA
<213> Homo sapiens
```

```
<400> 430
acctctgcca gaagtccagc gagaggacct cacagtagag cacaggccac tccgggagtg 60
catcagaaga ttcatcctca tggaggaaga aggcttcaaa cgtgaatggg taggagaagt 120
```

127

```
gagccacctt gtccattgcc agggacttgg tggtgcaggt ctgtgttact cctgagagct 180
gctggaatgc tgggcttgac cagtgagcag ttggcaattc tacaaagaag tggacgtaga 240
gattgtcata ctcatagcct tgggctgaaa cgacctctcc atttacaaag agccggaggg 300
cacctgggac agtcatctca aagtcggtgc ctacgaggct gctgagatac tccttgtgcc 360
ggccataaag atccttgaac actcgccgtt cccgctcctc ctcctccggc tgtgcgtggg 420
gggaaacatt gtcg                                                  434
```

```
<210> 431
<211> 581
<212> DNA
<213> Homo sapiens
```

```
<400> 431
acacaagcct ccagcccgac ccagcggcct aatgaaactc tggcaaccta tcctgggcgt 60
ggccacgagt atccagctcc aagcccaagt gaggcgggga gtcaacttcc ccatgattgc 120
caagtgacca agaccagaag cagggacgat taggctagtt ctgcggcaag gtgaactgga 180
gaccctgtct ctgccctcct tccctggcct gtcccacaga catcccgttg tttaacccac 240
tgcctttgca aggacctgct ctgtccactc caaatcaaag gatacttgca tccttcttac 300
acagactccc atctctctgc tcatagtggt cccaggctgc ccgagaaaaa gaaacttggg 360
tcagtagaag gctcattagt gtgaaggagt gagaggccag gccttcctgt gacataatgc 420
ttctatgctt gtttcctaaa cacttggtcc acacacaata cctgggcagg aagagagaac 480
caagcaccac tggatggctc tggagccagg ggacttctat gcacatacaa ccaacatcac 540
cccactctgc tcatctgtgc ctccaccctg aacagcagag t                    581
```

```
<210> 432
<211> 532
<212> DNA
<213> Homo sapiens
```

```
<400> 432
actccaactc aagtttacaa gttacacctt tgccacagcc ttggctaaat cttgaactag 60
tgcagaattc agctgtggta gagtgctgat cttagcatgc ttcgatgtgg catacttgtt 120
cttgacagtc atgtgctttg taagtccttg atttaccatg actacattct tagccaggtg 180
ctgcataact ggaagaagag attcttcagt atatgacagg taatgttgta gagttggtgt 240
ccattcacca ttatccagaa tttttcagtgc taagcaaaaa gctcctgctg caatttgaga 300
aggaggaaag tgcaccatgt catagtccaa catagttagt tccatcaggt atttggccaa 360
agtatgttgc tcgacatcaa cctctccaat cttagatgct ctccgaagga agtgcaaagg 420
tagaggccga cccagaccaa agtttaaagc tcttagaatc ttcatttcca tctgtctgat 480
ttggtgctta gtataagtgt tgtcagtcac aaaagcaaag tcaccaattt ct          532
```

```
<210> 433
<211> 531
<212> DNA
<213> Homo sapiens
```

```
<400> 433
acttggtttt acagctcctt tgaaaactct gtgtttggaa tatctctaaa aacatagaaa 60
acactacagt ggtttagaaa ttactaattt tacttctaag tcattcataa accttgtcta 120
tgaaatgact tcttaaatat ttagttgata gactgctaca ggtaataggg acttagcaag 180
ctcttttata tgctaaagga gcatctatca gattaagtta gaacatttgc tgtcagccac 240
atattgagat gacactaggt gcaatagcag ggatagattt tgttggtgag tagtctcatg 300
ccttgagatc tgtggtggtc ttcaaaatgg tggccagcca gatcaaggat gtagtatctc 360
atagttccca ggtgatattt tcttattag aaaaatatta taactcattt gttgtttgac 420
acttatagat tgaaatttcc taatttattc taaattttaa gtggttcttt ggttccagtg 480
ctttatgttg ttgttgtttt tggatggtgt tacatattat atgttctaga a           531
```

128

<210> 434
<211> 530
<212> DNA
<213> Homo sapiens

<400> 434
acaagagaaa acccctaaaa aaaggatggc tttagatgac aagctctacc agagagactt 60
agaagttgca ctagctttat cagtgaagga acttccaaca gtcaccacta atgtgcagaa 120
ctctcaagat aaaagcattg aaaaacatgg cagtagtaaa atagaaacaa tgaataagtc 180
tcctcatatc tctaattgca gtgtagccag tgattatta gatttggata agattactgt 240
ggaagatgat gttggtggtg ttcaagggaa aagaaaagca gcatctaaag ctgcagcaca 300
gcagaggaag attcttctgg aaggcagtga tggtgatagt gctaatgaca ctgaaccaga 360
ctttgcacct ggtgaagatt ctgaggatga ttctgatttt tgtgagagtg aggataatga 420
cgaagacttc tctatgagaa aaagtaaagt taaagaaatt aaaaagaaag aagtgaaggt 480
aaaatcccca gtagaaaaga aagagaagaa atctaaatcc aaatgtaatg   530

<210> 435
<211> 677
<212> DNA
<213> Homo sapiens

<400> 435
accttatgat ctaattaata gatattagaa acagtagaaa gacaagttac acgtcaatgc 60
ccaatgacta gagtcaacat taaagagttg taatttaagt aatccaaact gacatctaat 120
tccaaaatca tttataaaat gtatttggct ttggaatcca caggacttca aacaagcaaa 180
gtttcactgc agatagtcac aaagatgcag atacactgaa atacttaaga gccttattaa 240
tgattttgt tattttggat cttctgtttt tttcttatta tggtccgaag cctccttaat 300
accaatttat cagacagaag catgtcatct tgttgttcaa gataatccag taaattttca 360
gtccattcaa gtgccgcttt atggctaata cgcttctctg gattcagttc tgttttcta 420
ctcttactgg aaggcttttg ctcagcagcc ttggtctggt cctcagcact ttcactgtca 480
gtcagcacct gacagcttga gtcactgctc cgagagtcga accactgatc aatattctca 540
atgtcaacat gttcacattc ttctgtgttc tgtaaaactg ttgctaaatt agctgctaaa 600
atggctcctt catcaatgtt catacctgaa ttctcttcat tgccagggaa aagttttttc 660
catgctttgg ttatggt   677

<210> 436
<211> 573
<212> DNA
<213> Homo sapiens

<400> 436
acctcttagg gtgggagaaa tggtgaagag ttgttcctac aacttgctaa cctagtggac 60
agggtagtag attagcatca tccggataga tgtgaagagg acggctgttt ggataataat 120
taaggataaa atttggccag ttgacagatt ctgttccag cagttttac agcaacagtg 180
gagtgcttca gtattgtgtt cctgtaaatt taattttgat ccgcaatcat ttggtataca 240
atgctgtttg aagttttgtc ctattggaaa agtcttgtgt tgcaggggtg cagttaagat 300
ctttgtgatg aggaatggga tgggctaatt ttttgccgtt ttcttggaat tgggggcatg 360
gcaaatacag tagggtagtt tagttctta cacagaacat gataaactac acctgttgat 420
gtcaccgtct gtcaatgaat attatagaag gtatgaaggt gtaattacca taataacaaa 480
acaccctgtc tttagggctg acctttcgtc ctttgacctc ctcagcctcc attcccatct 540
tcgctcagac tgcaagtatg tttgtattaa tgt   573

<210> 437
<211> 645

129

```
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(645)
<223> n = A,T,C or G

<400> 437
acaattggta tccatatctt gttgaaattg taatgggaaa acaatatatt tcaatctcta 60
tgtagatagt gggtttttgt tttcataata tattcttttа gtttactgta tgagttttgc 120
aggactgcat aatagatcac cacaatcata acatcttagg accacagaca tttatgagat 180
catggcttct gtgggttaga agtatgctca tgtcttaact gggtcctctg ctcagtctta 240
tctggctgca atcaaggtgt cagctgggct gaattttcat ttggaatctt gactgggaaa 300
gagtctgctt ccaaggtcat gaagtttgct ggcaaaatgt atgtttttat gacagtatga 360
ctgaaatccc aagctatctc ctgactttta gctgggtaat ctcaggccct aaatgttgcc 420
tacagttcct agaggctggt cacagttctt agccatgtgg atttcctcaa catggctgct 480
tgcttcatca agtcagcaag aatagcctgt catatcagtg tatatcaggc tcactcagga 540
taatttccct actgatgagc caaacactaa ctgattttag agcttaacta catctgcaaa 600
attcngttca ccagaggcaa gtcatattca gggaaggaga agtgt 645

<210> 438
<211> 485
<212> DNA
<213> Homo sapiens

<400> 438
acagaattga gagacaagat tgcttgtaat ggagatgctt ctagctctca gataatacat 60
atttctgatg aaaatgaagg aaaagaaatg tgtgttctgc gaatgactcg agctagacgt 120
tcccaggtag aacagcagca gctcatcact gttgaaaagg ctttggcaat tctttctcag 180
cctacaccct cacttgttgt ggatcatgag cgattaaaaa atcttttgaa gactgttgtt 240
aaaaaaagtc aaaactacaa catatttcag ttggaaaatt tgtatgcagt aatcagccaa 300
tgtatttatc ggcatcgcaa ggaccatgat aaaacatcac ttattcagaa aatggagcaa 360
gaggtagaaa acttcagttg ttccagatga tgatgtcatg gtatcgagta ttctttatat 420
tcagttccta tttaagtcat ttttgtcatg tccgcctaat tgatgtagta tgaaaccctg 480
catct 485

<210> 439
<211> 533
<212> DNA
<213> Homo sapiens

<400> 439
acagcagttt cctcatccct gcagctgtgt ttgaacaggt catttaccat actgtcctcc 60
aggttcaaca gtatggctcc aaatgatgaa attccattct gattttctgg ctgaagacta 120
ttctgtttgt gtatgtccac cacagttact ttatcccttc atctgtggat gggcagaatg 180
aaacatatat ggaaatgttc tgtgcaataa aaacagcagt ggtaacacag atgtaggctc 240
tgagtgtctc actggagact gaagtccaca gatatgcaac aaagcctttg tctccctgat 300
gttttgcct cctgctggtc atgtgctttc acacatcaag agaggacatt taacatttga 360
gccacagtgt catttgctgt tgtctgatgg ttggttggca gagaatttga actggagatg 420
aactttatta tccaggacgc tgagagtata acatgcatga cagagctttt agagcactgt 480
gatgtaacat gtcaagcaga aatagggagc atgtttacag ccattctatg aaa 533

<210> 440
<211> 341
```

130

```
<212> DNA
<213> Homo sapiens

<400> 440
catggggtag gggggtcggg gattcattga attgtggttg gcaggagcaa gccctgctca 60
cactctcaca ctcgcaccca gaattgtcaa agatacagat tgtaaaaatc tacgatccct 120
cagtctcact cacaaaaaat aaaatctcat gtccccaacg aacccagagt cagacgacag 180
ctggagcatt ggcagggaca gtcagaaagg agacaagtga aaacggtcag atggacacag 240
gcggaggaga aaagacagag ggagagagac catcgggaac aatcagaggg gccgagacga 300
tcagaaaagg gtcagcccga gacaggctga gccagagttt c                      341

<210> 441
<211> 572
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(572)
<223> n = A,T,C or G

<400> 441
aagtttgggg ataatttatt atgcagcaag agataataca caggacttct canagcactt 60
aatatgttaa tataaatctc caanaaaaaa gatatacaat gaaacattcc tcttagttat 120
ctggccaagg anactttntt tttttganaa tattcttcaa aaagctgatc taatgatatg 180
gctctggtcc tacaattcca tgtaacttct aaccttgatt ttatctcatg agcaaatcat 240
ttatccttcc agaacctcaa cttttccctt ttacaaagta gaaataaacc atctgccttt 300
acataaatca ttaatacagc cctggatggg cagattctga gctatttttg gctgggggg 360
gggaaatagc ctgtggaggt cctaaaaaga tctacggggc tcgagatggt tctctgcaag 420
gtagcaggtg ggctcagggc ccatttcagt ctttgttccc caggccattt ccacaaaatg 480
gtgagaaata gtgtcttctt ttagcttgct cataactcaa agatgggggg catggacctg 540
ggcctttcta ggctagggca tgaacctcct cc                                572

<210> 442
<211> 379
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(379)
<223> n = A,T,C or G

<400> 442
tcccagctgc actgcttaca cgtcttcctt cgtnttcacc taccccgagg ctgactcctt 60
ccccagntgt gcagctgccc accgcaaggg cagcagcagc aatgagcctt cctctgactc 120
gctcagctca cccacgctgc tggccctgtg aggggcagg gaaggggagg cagccggcac 180
ccacaagtgc cactgcccga gctggtgcat tacagagagg agaaacacat cttccctaga 240
gggttcctgt agacctaggg aggaccttat ctgtgcgtga aacacaccag gctgtgggcc 300
tcaaggactt gaaagcatcc atgtgtggac tcaagtcctt acctcttccg gagatgtagc 360
aaaacgcatg gagtgtgta                                               379

<210> 443
<211> 511
<212> DNA
```

131

<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)..:(511)
<223> n = A,T,C or G

<400> 443
acatgccccc aaaggctcgc ttcattgcta cgattctcta cttaaatcca cattcacagc 60
tattgcctca gaccctctgg aggaggggcc aggggttagc tggctttgaa tagcatgtag 120
agcacaggca gtgtggccac aaatgtcaca caggtgacca gggtgctata gatggtgttc 180
ctgttgactt gggcttctag tctctgctcc gtgtctgaca gtgccaagat catgctcccc 240
tgctccagca agaagctggg catagccccg tctgctggtt ccaccaggcc tgggtgtgct 300
gcagacttta caagctgaac cacccagcc atttggctac aagtctttc taggccatca 360
agctgctctc gtaagccttc tagacatgaa tggacttgcc tggaatgact aagctgctct 420
ttcaaggcag ctgaaaggac atcnacatct ctgtctctgg tcgggggact acctgcctgt 480
gacccagagt cctgccctgg cccagcagca t   511

<210> 444
<211> 612
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(612)
<223> n = A,T,C or G

<400> 444
acaggaagaa ttctacagtt aatctatcac agtgttccag caaagcatat gttgaaaact 60
acagttttca atctaacatc taaattttaa aaagtagcat ttcagcaaca aacaagctca 120
gagaggctca tggcaaaagt gaaataacag aactattgct cagatgtctg caaagtcaag 180
ctgctgccct cagctccgcc cacttgaagg cttaggcaga cacgtaaggt ggcggtggct 240
ccttggcagc accattcaca gtggcatcat catacggagg tagcagcacc gtagtgtcat 300
tgctggtaac ataaaccagg acatcagagg agttcctacc attgatgtat cggtagcagt 360
tccaaacaca gctaatcaag taacccttaa aagtcaagat aatgctaata aacagaagaa 420
taataaggac caaacaggta ggattcactg acatgacatc atctctgtag ggaaaattag 480
gaggcagttg ccgtatgtat tcctgaatgg agtttggata aataagcaca gtgattgcaa 540
ccaacanctt cagggcaaag tcaaagatct ggtaacagaa gaatgggatg atccaggctg 600
cgcgttgctt gt   612

<210> 445
<211> 708
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(708)
<223> n = A,T,C or G

<400> 445
accatcctgt tccaacagag ccattgccta ttcctaaatt gaatctgact gggtgtgccc 60
ctcctcggaa cacaacagta gaccttaata gtggaaacat cgatgtgcct cccaacatga 120
caagctgggc cagctttcat aatggtgtgg ctgctggcct gaagatagct cctgcctccc 180

132

```
agatcgactc agcttggatt gtttacaata agcccaagca tgctgagttg gccaatgagt 240
atgctggctt tctcatggct ctgggtttga atgggcacct taccaagctg gcgactctca 300
atatccatga ctacttgacc aagggccatg aaatgacaag cattggactg ctacttggtg 360
tttctgctgc aaaactaggc accatggata tgtctattac tcggcttgtt agcattcgca 420
ttcctgctct cttaccccca acgtccacag agttggatgt tcctcacaat gtccaagtgg 480
ctgcagtggt tggcattggc cttgtatatc aagggacagc tcacagacat actgcagaag 540
tcctgttggc tgagatagga cggcctcctg gtcctgaaat ggaatactgc actgacagag 600
agtcatactc cttagctgct ggcttggccc tgggcatggt ctncttgggg catggcagca 660
atttgatagg tatgtntgat ctcaatgtgc ctgagcagct ctatcagt            708
```

```
<210> 446
<211> 612
<212> DNA
<213> Homo sapiens
```

```
<400> 446
acaagcaacg cgcagcctgg atcatcccat tcttctgtta ccagatcttt gactttgccc 60
tgaacatgtt ggttgcaatc actgtgctta tttatccaaa ctccattcag gaatacatac 120
ggcaactgcc tcctaatttt ccctacagag atgatgtcat gtcagtgaat cctacctgtt 180
tggtccttat tattcttctg tttattagca ttatcttgac tttttaagggt tacttgatta 240
gctgtgtttg gaactgctac cgatacatca atggtaggaa ctcctctgat gtcctggttt 300
atgttaccag caatgacact acggtgctgc tacccccgta tgatgatgcc actgtgaatg 360
gtgctgccaa ggagccaccg ccaccttacg tgtctgccta agccttcaag tgggcggagc 420
tgagggcagc agcttgactt tgcagacatc tgagcaatag ttctgttatt tcacttttgc 480
catgagcctc tctgagcttg tttgttgctg aaatgctact tttttaaaatt tagatgttag 540
attgaaaact gtagtttttca acatatgctt tgctggaaca ctgtgataga ttaactgtag 600
aattcttcct gt                                                  612
```

```
<210> 447
<211> 642
<212> DNA
<213> Homo sapiens
```

```
<400> 447
actgaaagaa ttaaagtcag aagtcttccc aaaacaaaaa gaactgccca cagagaaaat 60
cctttctgat acttttcatt gctaaaataa aacaggcggg aaatgtggaa aagaaattca 120
acaaaataat gtagcaccag aagaacaagt cctagatgat tcaagttcaa aaggtaagct 180
ccagcaatgt ggaagaggta aagaccaatg tagacaagct gacgaggaat atcttctttt 240
ttggtttttct ggaagtagag ttcaggaaaa gcatgaagcc agtaagccag ctgtgatatg 300
tagaaaaact tcatttgaaa tgtcatcagg ttatggggat aagccctcca taagatagtt 360
gggtctgaga tgtagttttc agagatgaga atgaatgtgc cccaaacaca ggcaaaaagg 420
tagaacgcac taagctgacc agattcatta aacttgctgt gttttgtttt ggagaagtgc 480
attcgcctgt taatttttatc caacatatac tcttgaatta cggcatgaat aattatcgcc 540
actagcatgt agaagaaaac agtagccaaa tctttgatgc catagtaata aagggacact 600
gattcagtag cttgttcttc tgttgctggg agggtgacat tg               642
```

```
<210> 448
<211> 394
<212> DNA
<213> Homo sapiens
```

```
<220>
<221> misc_feature
<222> (1)...(394)
<223> n = A,T,C or G
```

```
<400> 448
accagaagac cttagaaaaa ggaggaaagg aggagaggca gataatttgg atgaattcct 60
caaagngttt gaaaatccag aggttcctag agaggaccag caacagcagc atcagcagcg 120
tgatgttatc gatgagccca ttattgaaga gccaagccgc ctccaggagt cagtgatgga 180
ggccagcaga acaaacatag atgagtcagc tatgcctcca ccaccacctc agggagttaa 240
gcgaaaagct ggacaaattg acccagagcc tgtgatgcct cctcagcagg tagagcagat 300
ggaaatacca cctgtagagc ttcccccaga agaacctcca aatatctgtc agctaatacc 360
agagttagaa cttctgccag aaaaagagaa ggag                            394


<210> 449
<211> 494
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
<222> (1)...(494)
<223> n = A,T,C or G


<400> 449
acaaaaaaca caaggaatac aacccaatag aaaatagtcc tgggaatgtg gtcagaagca 60
aaggcntgag tgtctttctc aaccgtgcaa aagccgtgtt cttcccggga aaccaggaaa 120
aggatccgct actcaaaaac caagaattta aaggagtttc ttaaatttcg accttgtttc 180
tgaagctcac ttttcagtgc cattgatgtg agatgtgctg gagtggctat taaccttttt 240
ttcctaaaga ttattgttaa atagatattg tggtttgggg aagttgaatt tttttataggt 300
taaatgtcat tttagagatg gggagaggga ttatactgca ggcagcttca gccatgttgt 360
gaaactgata aaagcaactt agcaaggctt ctttttcatta ttttttatgt ttcacttata 420
aagtcttagg taactagtag gatagaaaca ctgtgtcccg agagtaagga gagaagctac 480
tattgattag agcc                                                  494


<210> 450
<211> 547
<212> DNA
<213> Homo sapiens


<400> 450
actttgggct ccagacttca ctgtccttag gcattgaaac catcacctgg tttgcattct 60
tcatgactga ggttaactta aaacaaaaat ggtaggaaag ctttcctatg cttcgggtaa 120
gagacaaatt tgcttttgta gaattggtgg ctgagaaagg cagacagggc ctgattaaag 180
aagacatttg tcaccactag ccaccaagtt aagttgtgga acccaaaggt gacggccatg 240
gaaacgtaga tcatcagctc tgctaagtag ttaggggaag aaacatattc aaaccagtct 300
ccaaatggga tcctgtggtt acagtgaatg gccactcctg ctttattttt cctgagattg 360
ccgagaataa catggcactt atactgatgg gcagatgacc agatgaacat catcatccca 420
agaatatgga accaccgtgc ttgcatcaat agattttttcc ctgttatgta ggcattcctg 480
ccatccattg gcacttggct cagcacagtt aggccaacaa ggacataata gacaagtcca 540
aaacagt                                                          547


<210> 451
<211> 384
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
```

134

<222> (1)...(384)
<223> n = A,T,C or G

<400> 451
actacttnnt ggttaaaang ccactggtag agtcatctga ntgtaaacaa tgtccctgca 60
ctgctggaaa aatccactgg ctcccaagaa aagaaaatgg tctgaagcct ctgttgtggc 120
tctcacaact catctttccc taagtcatca agctccacat cactgaggtc aatgtcatcc 180
tccacgggaa gctcgccatc cctgccgtcc caaggctctc tctcaacgat ggtagggaaa 240
gccccgcctc ctacaggtgc cgtggagcca cgcccaaaag agagctccct gagaaactcg 300
ttgatgcctt gctcactgaa ggagcctttt agcagagcaa atttcatctt gcgtgcattg 360
atggcggcca tggcgggta ccca   384

<210> 452
<211> 381
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(381)
<223> n = A,T,C or G

<400> 452
actctaaagt tgccactctc acaggggtca gtgataccca ctgaacctgg caggaacagt 60
cctgcagcca gaatctgcaa gcagcgcctg tatgcaacgt ttagggccaa aggctgtctg 120
gtggggttgt tcatcacagc ataatggcct agtaggtcaa ggatccaggg tgtgaggggc 180
tcaaagccag gaaaacgaat cctcaagtcc ttcagtagtc tgatgagaac tttaactgtg 240
gactgagaag cattttcctc gaaccagcgg gcatgtcgga tggctgctaa ngcactctgc 300
aatactttga tatccaaatg gagttctgga tccagttttc naagattggg tggcactgtt 360
gtaatganaa tcttcactgt a   381

<210> 453
<211> 455
<212> DNA
<213> Homo sapiens

<400> 453
actgtgctaa acagcctata gccaagtttt aaagagttac aggaacaact gctacacatt 60
caaagaacag gcattcactg cagcctcctg atttgacctg atgggaggga caggagaatg 120
agtcactctg ccaccacttt tcctgccttg gatttgtaga ggatttgttt tgctctaatt 180
tgtttttcct atatctgccc tactaaggta cacagtctgg gcactttgaa aatgttaaag 240
tttttaacgt ttgactgaca gaagcagcac ttaaaggctt catgaatcta ttttccaaaa 300
aaagtatgct ttcagtaaaa cattttacca ttttatctaa ctatgcactg acattttgt 360
tcttcctgaa aaggggattt atgctaacac tgtattttta atgtaaaaat atacgtgtag 420
agatatttta acttcctgag tgacttatac ctcaa   455

<210> 454
<211> 383
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(383)
<223> n = A,T,C or G

135

<400> 454
acagagcanc tttacaagtt gtcacatttc tttataaatt tttttaaagc tacagtttaa 60
tacaaaatga attgcggttt tattacatta ataaccttc acctcagggt tttatgaaga 120
ggaaagggtt ttatgcaaaa gaaagtgcta caattcctaa tcattttaga cactttagga 180
gggggtgaag ttgtatgata aagcagatat tttaattatt tgttatcttt ttgtattgca 240
agaaatttct tgctagtgaa tcaagaaaac atccagattg acagtctaaa atggctactg 300
gtattttagt taattcaaaa atgaaacttt tcagtgattc actttactaa cattctattt 360
gagaaggctt attggtaaag ttt   383

<210> 455
<211> 383
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(383)
<223> n = A,T,C or G

<400> 455
actcctttan gacaaggaaa caggtatcag catgatggta gcagaaacct tatcaccaag 60
gtgcaggagc tgacttcttc caaagagttg tggttccggg cagcggtcat tgccgtgccc 120
attgctggag ggctgatttt agtgttgctt attatgttgg ccctgaggat gcttcgaagt 180
gaaaataaga ggctgcagga tcagcggcaa cagatgctct cccgtttgca ctacagcttt 240
cacggacacc attccaaaaa ggggcaggtt gcaaagttag acttggaatg catggtgccg 300
gtcagtgggc acgagaactg ctgtctgacc tgtgataaaa tgagacaagc agacctcagc 360
aacgataaga tcctctcgct tgt   383

<210> 456
<211> 543
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(543)
<223> n = A,T,C or G

<400> 456
acaaacattt tacaaaaaag aacattacca atatcagtgg cagtaagggc aagctgaaga 60
atangtagac tgagtttccg ggcaatgtct gtcctcaaag acatccaaac tgcgttcagg 120
cagctgaaac aggcttcttt cccagtgaca agcatatgtg gtcagtaata caaacgatgg 180
taaatgaggc tactacatag gcccagttaa caaactcctc ttctcctcgg gtaggccatg 240
atacaagtgg aactcatcaa ataatttaaa cccaaggcga taacaacact atttcccatc 300
taaactcatt taagccttca caatgtcgca atggattcag ttacttgcaa acgatcccgg 360
gttgtcatac agatacttgt ttttacaca taacgctgtg ccatcccttc cttcactgcc 420
ccagtcaggt ttcctgttgt tggaccgaaa ggggatacat tttagaaatg cttccctcaa 480
gacagaagtg agaaagaaag gagaccctga ggccaggatc tattaaacct ggtgtgtgcg 540
caa   543

<210> 457
<211> 544
<212> DNA
<213> Homo sapiens

136

```
<220>
<221> misc_feature
<222> (1)...(544)
<223> n = A,T,C or G

<400> 457
actggtgcca atattgncat ggtgagctcc tctctaatgt cttccagggc accaatatct 60
gcccatgtca cattagggac agtgacaaag ccttcccttt tggcagaggg ttggactgag 120
gatagagcaa caatgaaatc attcagttca atgcacagtc cttgcatctg ctcctctgag 180
aggggatctt ggtctcttag caaccccagc agcctttgta attcatcctg tgtttcagaa 240
gtgggctcag ttcccagcct ttcctcctgg actcctttag atggcaaatc ttccatttca 300
ggatttttct tctgctgttc ctgtagcttc attaagactc tattgactgc acacattgct 360
gcctctcggc acagtgccat gagatcagca ccaacaaagc ctggagttag gtgtgctaag 420
tgacagaaat caaaagcttg aggaagcctc agttttctgc acaatgtttg aagtattctt 480
tccctggatg cttcatctgg gatacctagg catatttctc ggtcgaacct tcccgcacgt 540
ctca                                                             544


<210> 458
<211> 382
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
<222> (1)...(382)
<223> n = A,T,C or G


<400> 458
acctntaggc tcaacggcag aancttcacc acaaaagcga aatgggcaca ccacagggag 60
aaaactggtt gtcctggatg tttgaaaagt tggtcgttgt catggtgtgt tacttcatcc 120
tatctatcat taactccatg gcacaaagtt atgccaaacg aatccagcag cggttgaact 180
cagaggagaa aactaaataa gtagagaaag ttttaaactg cagaaattgg agtggatggg 240
ttctgcctta aattgggagg actccaagcc gggaaggaaa attccctttt ccaacctgta 300
tcaattttta caactttttt cctgaaagca gtttagtcca tactttgcac tgacatactt 360
tttccttctg tgctaaggta ag                                          382


<210> 459
<211> 168
<212> DNA
<213> Homo sapiens


<400> 459
ctcgtactct agccaggcac gaaaccatga agtagcctga tccttcttag ccatcctggc 60
cgccttagcg gtagtaactt tgtgttatga atcacatgaa agcatggaat cttatgaact 120
taatcccttc attaacagga gaaatgcaaa taccttcata tcccctca              168


<210> 460
<211> 190
<212> DNA
<213> Homo sapiens


<220>
<221> misc_feature
<222> (1)...(190)
```

137

<400> 460
acanctgcta ccagggagcc gagagctgac tatcccagcc tcggctaatg tattctacgc 60
catggatgga gcttcacacg atttcctcct gcggcagcgg cgaaggtcct ctactgctac 120
acctggcgtc accagtggcc cgtctgcctc aggaactcct ccgagtgagg gaggaggggg 180
ctcctttccc   190

<210> 461
<211> 495
<212> DNA
<213> Homo sapiens

<400> 461
acagacaggc ttctctgcta tcctccaggc agtgtaatag tcaaggaaaa gggcaacagt 60
attggatcat tccttagaca ctaatcagct ggggaaagag ttcattggca aaagtgtcct 120
cccaagaatg gtttacacca agcagagagg acatgtcact gaatggggaa agggaacccc 180
cgtatccaca gtcactgtaa gcatccagta ggcaggaaga tggctttggg cagtggctgg 240
atgaaagcag atttgagata cccagctccg gaacgaggtc atcttctaca ggttcttcct 300
tcactgagac aatgaattca gggtgatcat tctctgaggg gctgagaggt gcttcctcga 360
ttttcactac cacattagct tggctctctg tctcagaggg tatctctaag actaggggct 420
tggtatatat gtggtcaaaa cgaattagtt cattaatggc ttccagcttg gctgatgacg 480
tccccactga cagag   495

<210> 462
<211> 493
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(493)
<223> n = A,T,C or G

<400> 462
acactgaaac ataaatccgc aagtcaccac acatacaaca cccggcagga aaaaaacaaa 60
aacagggngt ttacatgatc cctgtaacag ccatggtctc aaactcagat gcttcctcca 120
tctgccaagt gtgttttgga tacagagcac atcgtggctt ctggggtcac actcagctta 180
ggctgtgggt ccacagagca ctcatctggc tgggctatgg tggtggtggc tctactcaag 240
aagcaaagca gttaccagca cattcaaaca gtgtattgaa catcttttaa atatcaaagt 300
gagaaacaag aaggcaacat aataatgtta tcagaaagat gttaggaagt aaggacagct 360
gtgtaaagct tgaggctgaa aagtagcttg ccagcttcat ttctttggtt tcttgggtag 420
tgggcgccgg aacagcaaga tgtgaggttc tggttcatgg atcatataat ggacccatcc 480
ctgactctgc tga   493

<210> 463
<211> 3681
<212> DNA
<213> Homo sapiens

<400> 463
tccgagctga ttacagacac caaggaagat gctgtaaaga gtcagcagcc acagccctgg 60
ctagctggcc ctgtgggcat ttattagtaa agttttaatg acaaaagctt tgagtcaaca 120
cacccgtggg taattaacct ggtcatcccc accctggaga gccatcctgc ccatgggtga 180
tcaaagaagg aacatctgca ggaacacctg atgaggctgc acccttggcg gaaagaacac 240

```
ctgacacagc tgaaagcttg gtggaaaaaa cacctgatga ggctgcaccc ttggtggaaa 300
gaacacctga cacggctgaa agcttggtgg aaaaaacacc tgatgaggct gcatccttgg 360
tggagggaac atctgacaaa attcaatgtt tggagaaagc gacatctgga aagttcgaac 420
agtcagcaga agaaacacct agggaaatta cgagtcctgc aaaagaaaca tctgagaaat 480
ttacgtggcc agcaaaagga agacctagga agatcgcatg ggagaaaaaa gaagacacac 540
ctagggaaat tatgagtccc gcaaaagaaa catctgagaa atttacgtgg gcagcaaaag 600
gaagacctag gaagatcgca tgggagaaaa aagaaacacc tgtaaagact ggatgcgtgg 660
caagagtaac atctaataaa actaaagttt tggaaaaagg aagatctaag atgattgcat 720
gtcctacaaa agaatcatct acaaaagcaa gtgccaatga tcagaggttc ccatcagaat 780
ccaaacaaga ggaagatgaa gaatattctt gtgattctcg gagtctcttt gagagttctg 840
caaagattca agtgtgtata cctgagtcta tatcaaaa agtaatggag ataaatagag 900
aagtagaaga gcctcctaag aagccatctg ccttcaagcc tgccattgaa atgcaaaact 960
ctgttccaaa taaagccttt gaattgaaga atgaacaaac attgagagca gatccgatgt 1020
tcccaccaga atccaaacaa aaggactatg aagaaaattc ttgggattct gagagtctct 1080
gtgagactgt ttcacagaag gatgtgtgtt tacccaaggc tacacatcaa aaagaaatag 1140
ataaaataaa tggaaaatta gaagagtctc ctaataaaga tggtcttctg aaggctacct 1200
gcggaatgaa agtttctatt ccaactaaag ccttagaatt gaaggacatg caaactttca 1260
aagcagagcc tccggggaag ccatctgcct tcgagcctgc cactgaaatg caaaagtctg 1320
tcccaaataa agccttggaa ttgaaaaatg aacaaacatt gagagcagat gagatactcc 1380
catcagaatc caaacaaaag gactatgaag aaagttcttg ggattctgag agtctctgtg 1440
agactgtttc acagaaggat gtgtgtttac ccaaggctrc rcatcaaaaa gaaatagata 1500
aaataaatgg aaaattagaa gggtctcctg ttaaagatgg tcttctgaag gctaactgcg 1560
gaatgaaagt ttctattcca actaaagcct tagaattgat ggacatgcaa actttcaaag 1620
cagagcctcc cgagaagcca tctgccttcg agcctgccat tgaaatgcaa aagtctgttc 1680
caaataaagc cttggaattg aagaatgaac aaacattgag agcagatgag atactcccat 1740
cagaatccaa acaaaaggac tatgaagaaa gttcttggga ttctgagagt ctctgtgaga 1800
ctgtttcaca gaaggatgtg tgtttacccaa ggctrcrca tcaaaaagaa atagataaaa 1860
taaatggaaa attagaagag tctcctgata atgatggttt tctgaaggct ccctgcagaa 1920
tgaaagtttc tattccaact aaagccttag aattgatgga catgcaaact tcaaagcag 1980
agcctcccga gaagccatct gccttcgagc ctgccattga aatgcaaaag tctgttccaa 2040
ataaagcctt ggaattgaag aatgaacaaa cattgagagc agatcagatg ttcccttcag 2100
aatcaaaaca aaagaasgtt gaagaaaatt cttgggattc tgagagtctc cgtgagactg 2160
tttcacagaa ggatgtgtgt gtacccaagg ctacacatca aaaagaaatg gataaaataa 2220
gtggaaaatt agaagattca actagcctat caaaaatctt ggatacagtt cattcttgtg 2280
aaagagcaag ggaacttcaa aaagatcact gtgaacaacg tacaggaaaa atggaacaaa 2340
tgaaaaagaa gttttgtgta ctgaaaaaga aactgtcaga agcaaaagaa ataaaatcac 2400
agttagagaa ccaaaaagtt aaatgggaac aagagctctg cagtgtgagg tttctcacac 2460
tcatgaaaat gaaaattatc tcttacatga aaattgcatg ttgaaaaagg aaaattgccat 2520
gctaaaactg gaaatagcca cactgaaaca ccaataccag gaaaaggaaa ataaatactt 2580
tgaggacatt aagattttaa aagaaaagaa tgctgaactt cagatgaccc taaaactgaa 2640
agaggaatca ttaactaaaa gggcatctca atatagtggg cagcttaaag ttctgatagc 2700
tgagaacaca atgctcactt ctaaattgaa ggaaaaacaa gacaaagaaa tactagaggc 2760
agaaattgaa tcacaccatc ctagactggc ttctgctgta caagaccatg atcaaattgt 2820
gacatcaaga aaaagtcaag aacctgcttt ccacattgca ggagatgctt gtttgcaaag 2880
aaaaatgaat gttgatgtga gtagtacgat atataacaat gaggtgctcc atcaaccact 2940
ttctgaagct caaaggaaat ccaaaagcct aaaaattaat ctcaattatg cmggagatgc 3000
tctaagagaa aatacattgg tttcagaaca tgcacaaaga gaccaacgtg aaacacagtg 3060
tcaaatgaag gaagctgaac acatgtatca aaacgaacaa gataatgtga acaaacacac 3120
tgaacagcag gagtctctag atcagaaatt atttcaacta caaagcaaaa atatgtggct 3180
tcaacagcaa ttagttcatg cacataagaa agctgacaac aaaagcaaga taacaattga 3240
tattcatttt cttgagagga aaatgcaaca tcatctccta aaagagaaaa atgaggagat 3300
atttaattac aataaccatt taaaaaaccg tatatatcaa tatgaaaaag agaaagcaga 3360
aacagaaaac tcatgagaga caagcagtaa gaaacttctt ttggagaaac aacagaccag 3420
atctttactc acaactcatg ctaggaggcc agtcctagca tcaccttatg ttgaaaatct 3480
taccaatagt ctgtgtcaac agaatactta ttttagaaga aaaattcatg atttcttcct 3540
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139

```
gaagcctaca gacataaaat aacagtgtga agaattactt gttcacgaat tgcataaagc 3600
tgcacaggat tcccatctac cctgatgatg cagcagacat cattcaatcc aaccagaatc 3660
tcgctctgtc actcaggctg g                                            3681
```

<210> 464
<211> 1424
<212> DNA
<213> Homo sapiens

<400> 464
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tccgagctga ttacagacac caaggaagat gctgtaaaga gtcagcagcc acagccctgg 60
ctagctggcc ctgtgggcat ttattagtaa agttttaatg acaaaagctt tgagtcaaca 120
cacccgtggg taattaacct ggtcatcccc accctggaga gccatcctgc ccatgggtga 180
tcaaagaagg aacatctgca ggaacacctg atgaggctgc acccttggcg gaaagaacac 240
ctgacacagc tgaaagcttg gtggaaaaaa cacctgatga ggctgcaccc ttggtggaaa 300
gaacacctga cacggctgaa agcttggtgg aaaaaacacc tgatgaggct gcatccttgg 360
tggagggaac atctgacaaa attcaatgtt tggagaaagc gacatctgga aagttcgaac 420
agtcagcaga gaaacacct agggaaatta cgagtcctgc aaaagaaaca tctgagaaat 480
ttacgtggcc agcaaaagga gacctagga agatcgcatg ggagaaaaaa gaagacacac 540
ctagggaaat tatgagtccc gcaaaagaaa catctgagaa atttacgtgg gcagcaaaag 600
gaagacctag gaagatcgca tgggagaaaa aagaaacacc tgtaaagact ggatgcgtgg 660
caagagtaac atctaataaa actaaagttt tggaaaaagg aagatctaag atgattgcat 720
gtcctacaaa agaatcatct acaaaagcaa gtgccaatga tcagaggttc ccatcagaat 780
ccaaacaaga ggaagatgaa gaatattctt gtgattctcg gagtctcttt gagagttctg 840
caaagattca agtgtgtata cctgagtcta tatatcaaaa agtaatggag ataaatagag 900
aagtagaaga gcctcctaag aagccatctg ccttcaagcc tgccattgaa atgcaaaact 960
ctgttccaaa taaagccttt gaattgaaga atgaacaaac attgagagca gatccgatgt 1020
tcccaccaga atccaaacaa aaggactatg aagaaaattc ttgggattct gagagtctct 1080
gtgagactgt ttcacagaag gatgtgtgtt tacccaaggc tacacatcaa aaagaaatag 1140
ataaaataaa tggaaaatta gaaggtaaga accgtttttt atttaaaaat cagttgaccg 1200
aatatttctc taaactgatg aggagggata tcctctagta gctgaagaaa attacctcct 1260
aaatgcaaac catggaaaaa aagagaagtg caatggtcgt aagttgtatg tctcatcagg 1320
tgttggcaac agactatatt gagagtgctg aaaaggagct gaattattag tttgaattca 1380
agatattgca agacctgaga gaaaaaaaaa aaaaaaaaaa aaaa                   1424
```

<210> 465
<211> 674
<212> DNA
<213> Homo sapiens

<400> 465
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attccgagct gattacagac accaaggaag atgctgtaaa gagtcagcag ccacagccct 60
ggctagctgg ccctgtgggc atttattagt aaagttttaa tgacaaaagc tttgagtcaa 120
cacacccgtg ggtaattaac ctggtcatcc ccaccctgga gagccatcct gcccatgggt 180
gatcaaagaa ggaacatctg caggaacacc tgatgaggct gcacccttgg cggaaagaac 240
acctgacaca gctgaaagct tggtggaaaa aacacctgat gaggctgcac ccttggtgga 300
aagaacacct gacacggctg aaagcttggt ggaaaaaaca cctgatgagg ctgcatcctt 360
ggtggaggga acatctgaca aaattcaatg tttggagaaa gcgacatctg aaagttcga 420
acagtcagca gaagaaacac ctagggaaat tacgagtcct gcaaaagaaa catctgagaa 480
atttacgtgg ccagcaaaag gaagacctag gaagatcgca tgggagaaaa aagatgactc 540
agttaaggca aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 600
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 660
aaaaaaaaaa aaaa                                                    674
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<210> 466

140


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<211> 1729
<212> DNA
<213> Homo sapiens

<220>
<221> unsure
<222> (11)
<223> n=A,T,C or G
<221> unsure
<222> (1128)
<223> n=A,T,C or G

<400> 466
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catctgagaa atttacgtgg ccagcaaaag gaagacctag gaagatcgca tgggagaaaa 120
aagaagacac acctagggaa attatgagtc ccgcaaaaga aacatctgag aaatttacgt 180
gggcagcaaa aggaagacct aggaagatcg catgggagaa aaaagaaaca cctgtaaaga 240
ctggatgcgt ggcaagagta acatctaata aaactaaagt tttggaaaaa ggaagatcta 300
agatgattgc atgtcctaca aaagaatcat ctacaaaagc aagtgccaat gatcagaggt 360
tcccatcaga atccaaacaa gaggaagatg aagaatattc ttgtgattct cggagtctct 420
ttgagagttc tgcaaagatt caagtgtgta tacctgagtc tatatatcaa aaagtaatgg 480
agataaatag agaagtagaa gagcctccta agaagccatc tgccttcaag cctgccattg 540
aaatgcaaaa ctctgttcca aataaagcct ttgaattgaa gaatgaacaa acattgagag 600
cagatccgat gttcccacca gaatccaaac aaaaggacta tgaagaaaat tcttgggatt 660
ctgagagtct ctgtgagact gtttcacaga aggatgtgtg tttacccaag gctacacatc 720
aaaaagaaat agataaaata aatggaaaat tagaagagtc tcctaataaa gatggtcttc 780
tgaaggctac ctgcggaatg aaagtttcta ttccaactaa agccttagaa ttgaaggaca 840
tgcaaacttt caaagcagag cctccgggga agccatctgc cttcgagcct gccactgaaa 900
tgcaaaagtc tgtcccaaat aaagccttgg aattgaaaaa tgaacaaaca ttgagagcag 960
atgagatact cccatcagaa tccaaacaaa aggactatga agaaaattct tgggatactg 1020
agagtctctg tgagactgtt tcacagaagg atgtgtgttt acccaaggct gcgcatcaaa 1080
aagaaataga taaataaat ggaaaattag aagggtctcc tggtaaanat ggtcttctga 1140
aggctaactg cggaatgaaa gtttctattc caactaaagc cttagaattg atggacatgc 1200
aaactttcaa agcagagcct cccgagaagc catctgcctt cgagcctgcc attgaaatgc 1260
aaaagtctgt tccaaataaa gccttggaat tgaagaatga acaaacattg agcagatg 1320
agatactccc atcagaatcc aaacaaaagg actatgaaga aagttcttgg gattctgaga 1380
gtctctgtga gactgtttca cagaaggatg tgtgtttacc caaggctgcg catcaaaaag 1440
aaatagataa aataaatgga aaattagaag gtaagaaccg ttttttattt aaaaatcatt 1500
tgaccaaata tttctctaaa ttgatgagga aggatatcct ctagtagctg aagaaaatta 1560
cctcctaaat gcaaaccatg gaaaaaaga gaagtgcaat ggtcataagc tatgtgtctc 1620
atcaggcatt ggcaacagac tatattgtga gtgctgaaga ggagctgaat tactagttta 1680
aattcaagat attccaagac gtgaggaaaa tgagaaaaaa aaaaaaaaa         1729

<210> 467
<211> 1337
<212> DNA
<213> Homo sapiens

<400> 467
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tgaaggctaa ctgcggaatg aaagtttcta ttccaactaa agccttagaa ttgatggaca 120
tgcaaacttt caaagcagag cctcccgaga agccatctgc cttcgagcct gccattgaaa 180
tgcaaaagtc tgttccaaat aaagccttgg aattgaagaa tgaacaaaca ttgagagcag 240
atgagatact cccatcagaa tccaaacaaa aggactatga agaaagttct tgggattct 300
agagtctctg tgagactgtt tcacagaagg atgtgtgttt acccaaggct gcgcatcaaa 360
```

141

```
aagaaataga taaaataaat ggaaaattag aagagtctcc tgataatgat ggttttctga 420
aggctccctg cagaatgaaa gtttctattc caactaaagc cttagaattg atggacatgc 480
aaactttcaa agcagagcct cccgagaagc catctgcctt cgagcctgcc attgaaatgc 540
aaaagtctgt tccaaataaa gccttggaat tgaagaatga acaaacattg agagcagatc 600
agatgttccc ttcagaatca aaacaaaaga aggttgaaga aaattcttgg gattctgaga 660
gtctccgtga gactgtttca cagaaggatg tgtgtgtacc caaggctaca catcaaaaag 720
aaatggataa aataagtgga aaattagaag attcaactag cctatcaaaa atcttggata 780
cagttcattc ttgtgaaaga gcaagggaac ttcaaaaaga tcactgtgaa caacgtacag 840
gaaaaatgga acaaatgaaa aagaagtttt gtgtactgaa aaagaaactg tcagaagcaa 900
aagaaataaa atcacagtta gagaaccaaa aagttaaatg ggaacaagag ctctgcagtg 960
tgagattgac tttaaaccaa gaagaagaga agagaagaaa tgccgatata ttaaatgaaa 1020
aaattaggga agaattagga agaatcgaag agcagcatag gaaagagtta gaagtgaaac 1080
aacaacttga acaggctctc agaatacaag atatagaatt gaagagtgta gaaagtaatt 1140
tgaatcaggt ttctcacact catgaaaatg aaaattatct cttacatgaa aattgcatgt 1200
tgaaaaagga aattgccatg ctaaaactgg aaatagccac actgaaacac caataccagg 1260
aaaaggaaaa taaatacttt gaggacatta agattttaaa agaaaagaat gctgaacttc 1320
agatgacccc tcgtgcc                                                1337
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<210> 468
<211> 2307
<212> DNA
<213> Homo sapiens
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<400> 468
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ttgggattct gagagtctct gtgagactgt ttcacagaag gatgtgtgtt tacccaaggc 120
tacacatcaa aaagaaatag ataaataaaa tggaaaatta gaagggtctc ctgttaaaga 180
tggtcttctg aaggctaact gcggaatgaa agtttctatt ccaactaaag ccttagaatt 240
gatggacatg caaactttca aagcagagcc tcccgagaag ccatctgcct tcgagcctgc 300
cattgaaatg caaaagtctg ttccaaataa agccttggaa ttgaagaatg aacaaacatt 360
gagagcagat gagatactcc catcagaatc caaacaaaag gactatgaag aaagttcttg 420
ggattctgag agtctctgtg agactgtttc acagaaggat gtgtgtttac ccaaggctac 480
acatcaaaaa gaaatagata aataaatgg aaaattagaa gagtctcctg ataatgatgg 540
ttttctgaag tctccctgca gaatgaaagt ttctattcca actaaagcct tagaattgat 600
ggacatgcaa actttcaaag cagagcctcc cgagaagcca tctgccttcg agcctgccat 660
tgaaatgcaa aagtctgttc caaataaagc cttggaattg aagaatgaac aaacattgag 720
agcagatcag atgttccctt cagaatcaaa acaaaagaac gttgaagaaa attcttggga 780
ttctgagagt ctccgtgaga ctgtttcaca gaaggatgtg tgtgtaccca aggctacaca 840
tcaaaaagaa atggataaaa taagtggaaa attagaagat tcaactagcc tatcaaaaat 900
cttggataca gttcattctt gtgaaagagc aagggaactt caaaaagatc actgtgaaca 960
acgtacagga aaaatggaac aaatgaaaaa gaagttttgt gtactgaaaa agaaactgtc 1020
agaagcaaaa gaaataaaat cacagttaga gaaccaaaaa gttaaatggg aacaagagct 1080
ctgcagtgtg aggtttctca cactcatgaa aatgaaaatt atctcttaca tgaaaattgc 1140
atgttgaaaa ggaaattgc catgctaaaa ctggaaatag ccacactgaa acaccaatac 1200
caggaaaagg aaaataaata ctttgaggac attaagattt taaagaaaa gaatgctgaa 1260
cttcagatga ccctaaaact gaaagaggaa tcattaacta aaagggcatc tcaatatagt 1320
gggcagctta agttctgat agctgagaac acaatgctca cttctaaatt gaaggaaaaa 1380
caagacaaag aaatactaga ggcagaaatt gaatcacacc atcctagact ggcttctgct 1440
gtacaagacc atgatcaaat tgtgacatca agaaaaagtc aagaacctgc tttccacatt 1500
gcaggagatg cttgtttgca agaaaaatg aatgttgatg tgagtagtac gatatataac 1560
aatgaggtgc tccatcaacc actttctgaa gctcaaagga aatccaaaag cctaaaaatt 1620
aatctcaatt atgcaggaga tgctctaaga gaaaatacat tggtttcaga acatgcacaa 1680
agagaccaac gtgaaacaca gtgtcaaatg aaggaagctg aacacatgta tcaaaacgaa 1740
caagataatg tgaacaaaca cactgaacag caggagtctc tagatcagaa attatttcaa 1800
ctacaaagca aaaatatgtg gcttcaacag caattagttc atgcacataa gaaagctgac 1860
```

```
aacaaaagca agataacaat tgatattcat tttcttgaga ggaaaatgca acatcatctc 1920
ctaaaagaga aaaatgagga gatatttaat tacaataacc atttaaaaaa ccgtatatat 1980
caatatgaaa aagagaaagc agaaacagaa aactcatgag agacaagcag taagaaactt 2040
cttttggaga aacaacagac cagatctttta ctcacaactc atgctaggag gccagtccta 2100
gcatcacctt atgttgaaaa tcttaccaat agtctgtgtc aacagaatac ttattttaga 2160
agaaaaattc atgatttctt cctgaagcct acagacataa aataacagtg tgaagaatta 2220
cttgttcacg aattgcataa agctgcacag gattcccatc taccctgatg atgcagcaga 2280
catcattcaa tccaaccaga atctcgc                                    2307
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<210> 469
<211> 650
<212> PRT
<213> Homo sapiens

<220>
<221> unsure
<222> (310)
<223> Xaa = Any Amino Acid<221> unsure
<222> (429)
<223> Xaa = Any Amino Acid<221> unsure
<222> (522)
<223> Xaa = Any Amino Acid

<400> 469
Met Ser Pro Ala Lys Glu Thr Ser Glu Lys Phe Thr Trp Ala Ala Lys
                  5                  10                  15

Gly Arg Pro Arg Lys Ile Ala Trp Glu Lys Lys Glu Thr Pro Val Lys
                 20                  25                  30

Thr Gly Cys Val Ala Arg Val Thr Ser Asn Lys Thr Lys Val Leu Glu
             35                  40                  45

Lys Gly Arg Ser Lys Met Ile Ala Cys Pro Thr Lys Glu Ser Ser Thr
         50                  55                  60

Lys Ala Ser Ala Asn Asp Gln Arg Phe Pro Ser Glu Ser Lys Gln Glu
 65                  70                  75                  80

Glu Asp Glu Glu Tyr Ser Cys Asp Ser Arg Ser Leu Phe Glu Ser Ser
                 85                  90                  95

Ala Lys Ile Gln Val Cys Ile Pro Glu Ser Ile Tyr Gln Lys Val Met
            100                 105                 110

Glu Ile Asn Arg Glu Val Glu Glu Pro Pro Lys Lys Pro Ser Ala Phe
        115                 120                 125

Lys Pro Ala Ile Glu Met Gln Asn Ser Val Pro Asn Lys Ala Phe Glu
    130                 135                 140

Leu Lys Asn Glu Gln Thr Leu Arg Ala Asp Pro Met Phe Pro Pro Glu
145                 150                 155                 160

Ser Lys Gln Lys Asp Tyr Glu Glu Asn Ser Trp Asp Ser Glu Ser Leu
```

143

```
                165                     170                     175
Cys Glu Thr Val Ser Gln Lys Asp Val Cys Leu Pro Lys Ala Thr His
        180                     185                     190

Gln Lys Glu Ile Asp Lys Ile Asn Gly Lys Leu Glu Glu Ser Pro Asn
        195                     200                     205

Lys Asp Gly Leu Leu Lys Ala Thr Cys Gly Met Lys Val Ser Ile Pro
    210                     215                     220

Thr Lys Ala Leu Glu Leu Lys Asp Met Gln Thr Phe Lys Ala Glu Pro
225                     230                     235                     240

Pro Gly Lys Pro Ser Ala Phe Glu Pro Ala Thr Glu Met Gln Lys Ser
            245                     250                     255

Val Pro Asn Lys Ala Leu Glu Leu Lys Asn Glu Gln Thr Leu Arg Ala
        260                     265                     270

Asp Glu Ile Leu Pro Ser Glu Ser Lys Gln Lys Asp Tyr Glu Glu Ser
        275                     280                     285

Ser Trp Asp Ser Glu Ser Leu Cys Glu Thr Val Ser Gln Lys Asp Val
    290                     295                     300

Cys Leu Pro Lys Ala Xaa His Gln Lys Glu Ile Asp Lys Ile Asn Gly
305                     310                     315                     320

Lys Leu Glu Gly Ser Pro Val Lys Asp Gly Leu Leu Lys Ala Asn Cys
            325                     330                     335

Gly Met Lys Val Ser Ile Pro Thr Lys Ala Leu Glu Leu Met Asp Met
            340                     345                     350

Gln Thr Phe Lys Ala Glu Pro Pro Glu Lys Pro Ser Ala Phe Glu Pro
        355                     360                     365

Ala Ile Glu Met Gln Lys Ser Val Pro Asn Lys Ala Leu Glu Leu Lys
    370                     375                     380

Asn Glu Gln Thr Leu Arg Ala Asp Glu Ile Leu Pro Ser Glu Ser Lys
385                     390                     395                     400

Gln Lys Asp Tyr Glu Glu Ser Ser Trp Asp Ser Glu Ser Leu Cys Glu
            405                     410                     415

Thr Val Ser Gln Lys Asp Val Cys Leu Pro Lys Ala Xaa His Gln Lys
            420                     425                     430

Glu Ile Asp Lys Ile Asn Gly Lys Leu Glu Glu Ser Pro Asp Asn Asp
        435                     440                     445

Gly Phe Leu Lys Ala Pro Cys Arg Met Lys Val Ser Ile Pro Thr Lys
    450                     455                     460
```

```
Ala Leu Glu Leu Met Asp Met Gln Thr Phe Lys Ala Glu Pro Pro Glu
465                 470             475                 480

Lys Pro Ser Ala Phe Glu Pro Ala Ile Glu Met Gln Lys Ser Val Pro
            485             490             495

Asn Lys Ala Leu Glu Leu Lys Asn Glu Gln Thr Leu Arg Ala Asp Gln
        500             505             510

Met Phe Pro Ser Glu Ser Lys Gln Lys Xaa Val Glu Glu Asn Ser Trp
        515             520             525

Asp Ser Glu Ser Leu Arg Glu Thr Val Ser Gln Lys Asp Val Cys Val
        530             535             540

Pro Lys Ala Thr His Gln Lys Glu Met Asp Lys Ile Ser Gly Lys Leu
545             550             555             560

Glu Asp Ser Thr Ser Leu Ser Lys Ile Leu Asp Thr Val His Ser Cys
            565             570             575

Glu Arg Ala Arg Glu Leu Gln Lys Asp His Cys Glu Gln Arg Thr Gly
        580             585             590

Lys Met Glu Gln Met Lys Lys Lys Phe Cys Val Leu Lys Lys Lys Leu
        595             600             605

Ser Glu Ala Lys Glu Ile Lys Ser Gln Leu Glu Asn Gln Lys Val Lys
    610             615             620

Trp Glu Gln Glu Leu Cys Ser Val Arg Phe Leu Thr Leu Met Lys Met
625             630             635             640

Lys Ile Ile Ser Tyr Met Lys Ile Ala Cys
            645             650
```

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<210> 470
<211> 228
<212> PRT
<213> Homo sapiens

<400> 470
Met Ser Pro Ala Lys Glu Thr Ser Glu Lys Phe Thr Trp Ala Ala Lys
                5               10              15

Gly Arg Pro Arg Lys Ile Ala Trp Glu Lys Lys Glu Thr Pro Val Lys
            20              25              30

Thr Gly Cys Val Ala Arg Val Thr Ser Asn Lys Thr Lys Val Leu Glu
        35              40              45

Lys Gly Arg Ser Lys Met Ile Ala Cys Pro Thr Lys Glu Ser Ser Thr
    50              55              60
```

145

```
Lys Ala Ser Ala Asn Asp Gln Arg Phe Pro Ser Glu Ser Lys Gln Glu
 65              70              75              80

Glu Asp Glu Glu Tyr Ser Cys Asp Ser Arg Ser Leu Phe Glu Ser Ser
                85              90              95

Ala Lys Ile Gln Val Cys Ile Pro Glu Ser Ile Tyr Gln Lys Val Met
            100             105             110

Glu Ile Asn Arg Glu Val Glu Glu Pro Pro Lys Lys Pro Ser Ala Phe
        115             120             125

Lys Pro Ala Ile Glu Met Gln Asn Ser Val Pro Asn Lys Ala Phe Glu
    130             135             140

Leu Lys Asn Glu Gln Thr Leu Arg Ala Asp Pro Met Phe Pro Pro Glu
145             150             155             160

Ser Lys Gln Lys Asp Tyr Glu Glu Asn Ser Trp Asp Ser Glu Ser Leu
            165             170             175

Cys Glu Thr Val Ser Gln Lys Asp Val Cys Leu Pro Lys Ala Thr His
            180             185             190

Gln Lys Glu Ile Asp Lys Ile Asn Gly Lys Leu Glu Gly Lys Asn Arg
    195             200             205

Phe Leu Phe Lys Asn Gln Leu Thr Glu Tyr Phe Ser Lys Leu Met Arg
    210             215             220

Arg Asp Ile Leu
225


<210> 471
<211> 154
<212> PRT
<213> Homo sapiens

<220>
<221> unsure
<222> (148)
<223> Xaa = Any Amino Acid

<400> 471
Met Arg Leu His Pro Trp Arg Lys Glu His Leu Thr Gln Leu Lys Ala
                5               10              15

Trp Trp Lys Lys His Leu Met Arg Leu His Pro Trp Trp Lys Glu His
            20              25              30

Leu Thr Arg Leu Lys Ala Trp Trp Lys Lys His Leu Met Arg Leu His
        35              40              45
```

```
Pro Trp Trp Arg Glu His Leu Thr Lys Phe Asn Val Trp Arg Lys Arg
    50              55              60

His Leu Glu Ser Ser Asn Ser Gln Gln Lys Lys His Leu Gly Lys Leu
65              70              75                          80

Arg Val Leu Gln Lys Lys His Leu Arg Asn Leu Arg Gly Gln Gln Lys
                85              90                  95

Glu Asp Leu Gly Arg Ser His Gly Arg Lys Lys Met Thr Gln Leu Arg
            100             105             110

Gln Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
        115             120             125

Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
    130             135             140

Lys Lys Lys Xaa Lys Lys Lys Lys Lys Lys
145             150
```


<210> 472
<211> 467
<212> PRT
<213> Homo sapiens

<220>
<221> unsure
<222> (329)
<223> Xaa = Any Amino Acid

<400> 472
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Met Ser Pro Ala Lys Glu Thr Ser Glu Lys Phe Thr Trp Ala Ala Lys
                5               10              15

Gly Arg Pro Arg Lys Ile Ala Trp Glu Lys Lys Glu Thr Pro Val Lys
            20              25              30

Thr Gly Cys Val Ala Arg Val Thr Ser Asn Lys Thr Lys Val Leu Glu
        35              40              45

Lys Gly Arg Ser Lys Met Ile Ala Cys Pro Thr Lys Glu Ser Ser Thr
    50              55              60

Lys Ala Ser Ala Asn Asp Gln Arg Phe Pro Ser Glu Ser Lys Gln Glu
65              70              75                          80

Glu Asp Glu Glu Tyr Ser Cys Asp Ser Arg Ser Leu Phe Glu Ser Ser
            85              90                  95

Ala Lys Ile Gln Val Cys Ile Pro Glu Ser Ile Tyr Gln Lys Val Met
        100             105             110

Glu Ile Asn Arg Glu Val Glu Glu Pro Pro Lys Lys Pro Ser Ala Phe
```

147

```
              115                    120                      125
Lys Pro Ala Ile Glu Met Gln Asn Ser Val Pro Asn Lys Ala Phe Glu
    130                    135                    140

Leu Lys Asn Glu Gln Thr Leu Arg Ala Asp Pro Met Phe Pro Pro Glu
145                    150                    155                    160

Ser Lys Gln Lys Asp Tyr Glu Glu Asn Ser Trp Asp Ser Glu Ser Leu
                165                    170                    175

Cys Glu Thr Val Ser Gln Lys Asp Val Cys Leu Pro Lys Ala Thr His
                180                    185                    190

Gln Lys Glu Ile Asp Lys Ile Asn Gly Lys Leu Glu Glu Ser Pro Asn
        195                    200                    205

Lys Asp Gly Leu Leu Lys Ala Thr Cys Gly Met Lys Val Ser Ile Pro
    210                    215                    220

Thr Lys Ala Leu Glu Leu Lys Asp Met Gln Thr Phe Lys Ala Glu Pro
225                    230                    235                    240

Pro Gly Lys Pro Ser Ala Phe Glu Pro Ala Thr Glu Met Gln Lys Ser
                245                    250                    255

Val Pro Asn Lys Ala Leu Glu Leu Lys Asn Glu Gln Thr Leu Arg Ala
                260                    265                    270

Asp Glu Ile Leu Pro Ser Glu Ser Lys Gln Lys Asp Tyr Glu Glu Asn
        275                    280                    285

Ser Trp Asp Thr Glu Ser Leu Cys Glu Thr Val Ser Gln Lys Asp Val
    290                    295                    300

Cys Leu Pro Lys Ala Ala His Gln Lys Glu Ile Asp Lys Ile Asn Gly
305                    310                    315                    320

Lys Leu Glu Gly Ser Pro Gly Lys Xaa Gly Leu Leu Lys Ala Asn Cys
                325                    330                    335

Gly Met Lys Val Ser Ile Pro Thr Lys Ala Leu Glu Leu Met Asp Met
                340                    345                    350

Gln Thr Phe Lys Ala Glu Pro Pro Glu Lys Pro Ser Ala Phe Glu Pro
        355                    360                    365

Ala Ile Glu Met Gln Lys Ser Val Pro Asn Lys Ala Leu Glu Leu Lys
    370                    375                    380

Asn Glu Gln Thr Leu Arg Ala Asp Glu Ile Leu Pro Ser Glu Ser Lys
385                    390                    395                    400

Gln Lys Asp Tyr Glu Glu Ser Ser Trp Asp Ser Glu Ser Leu Cys Glu
                405                    410                    415
```

148

Thr Val Ser Gln Lys Asp Val Cys Leu Pro Lys Ala Ala His Gln Lys
        420   425   430

Glu Ile Asp Lys Ile Asn Gly Lys Leu Glu Gly Lys Asn Arg Phe Leu
        435   440   445

Phe Lys Asn His Leu Thr Lys Tyr Phe Ser Lys Leu Met Arg Lys Asp
    450   455   460

Ile Leu
465

<210> 473
<211> 445
<212> PRT
<213> Homo sapiens

<400> 473
Lys Glu Ile Asp Lys Ile Asn Gly Lys Leu Glu Gly Ser Pro Val Lys
                5   10   15

Asp Gly Leu Leu Lys Ala Asn Cys Gly Met Lys Val Ser Ile Pro Thr
            20   25   30

Lys Ala Leu Glu Leu Met Asp Met Gln Thr Phe Lys Ala Glu Pro Pro
        35   40   45

Glu Lys Pro Ser Ala Phe Glu Pro Ala Ile Glu Met Gln Lys Ser Val
    50   55   60

Pro Asn Lys Ala Leu Glu Leu Lys Asn Glu Gln Thr Leu Arg Ala Asp
65   70   75   80

Glu Ile Leu Pro Ser Glu Ser Lys Gln Lys Asp Tyr Glu Glu Ser Ser
            85   90   95

Trp Asp Ser Glu Ser Leu Cys Glu Thr Val Ser Gln Lys Asp Val Cys
        100   105   110

Leu Pro Lys Ala Ala His Gln Lys Glu Ile Asp Lys Ile Asn Gly Lys
        115   120   125

Leu Glu Glu Ser Pro Asp Asn Asp Gly Phe Leu Lys Ala Pro Cys Arg
    130   135   140

Met Lys Val Ser Ile Pro Thr Lys Ala Leu Glu Leu Met Asp Met Gln
145   150   155   160

Thr Phe Lys Ala Glu Pro Pro Glu Lys Pro Ser Ala Phe Glu Pro Ala
            165   170   175

Ile Glu Met Gln Lys Ser Val Pro Asn Lys Ala Leu Glu Leu Lys Asn
            180   185   190

```
Glu Gln Thr Leu Arg Ala Asp Gln Met Phe Pro Ser Glu Ser Lys Gln
        195                 200             205

Lys Lys Val Glu Glu Asn Ser Trp Asp Ser Glu Ser Leu Arg Glu Thr
        210                 215             220

Val Ser Gln Lys Asp Val Cys Val Pro Lys Ala Thr His Gln Lys Glu
225                 230             235                 240

Met Asp Lys Ile Ser Gly Lys Leu Glu Asp Ser Thr Ser Leu Ser Lys
                245             250             255

Ile Leu Asp Thr Val His Ser Cys Glu Arg Ala Arg Glu Leu Gln Lys
            260             265             270

Asp His Cys Glu Gln Arg Thr Gly Lys Met Glu Gln Met Lys Lys Lys
        275             280             285

Phe Cys Val Leu Lys Lys Lys Leu Ser Glu Ala Lys Glu Ile Lys Ser
        290             295             300

Gln Leu Glu Asn Gln Lys Val Lys Trp Glu Gln Glu Leu Cys Ser Val
305             310             315             320

Arg Leu Thr Leu Asn Gln Glu Glu Glu Lys Arg Arg Asn Ala Asp Ile
            325             330             335

Leu Asn Glu Lys Ile Arg Glu Glu Leu Gly Arg Ile Glu Glu Gln His
        340             345             350

Arg Lys Glu Leu Glu Val Lys Gln Gln Leu Glu Gln Ala Leu Arg Ile
        355             360             365

Gln Asp Ile Glu Leu Lys Ser Val Glu Ser Asn Leu Asn Gln Val Ser
    370             375             380

His Thr His Glu Asn Glu Asn Tyr Leu Leu His Glu Asn Cys Met Leu
385             390             395                 400

Lys Lys Glu Ile Ala Met Leu Lys Leu Glu Ile Ala Thr Leu Lys His
            405             410             415

Gln Tyr Gln Glu Lys Glu Asn Lys Tyr Phe Glu Asp Ile Lys Ile Leu
        420             425             430

Lys Glu Lys Asn Ala Glu Leu Gln Met Thr Pro Arg Ala
        435             440             445
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<210> 474
<211> 221
<212> DNA
<213> Homo sapiens

<220>

150

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<221> misc_feature
<222> (1)...(221)
<223> n = A,T,C or G

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tccgatcaaa agaatcatca tctttacctt gacttttcag ggaattactg aactttcttc 120
tcagaagata gggcacagcc attgccttgg cctcacttga agggtctgca tttgggtcct 180
ctggtctctt gccaagtttc ccagccactc gagggagaaa t            221
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